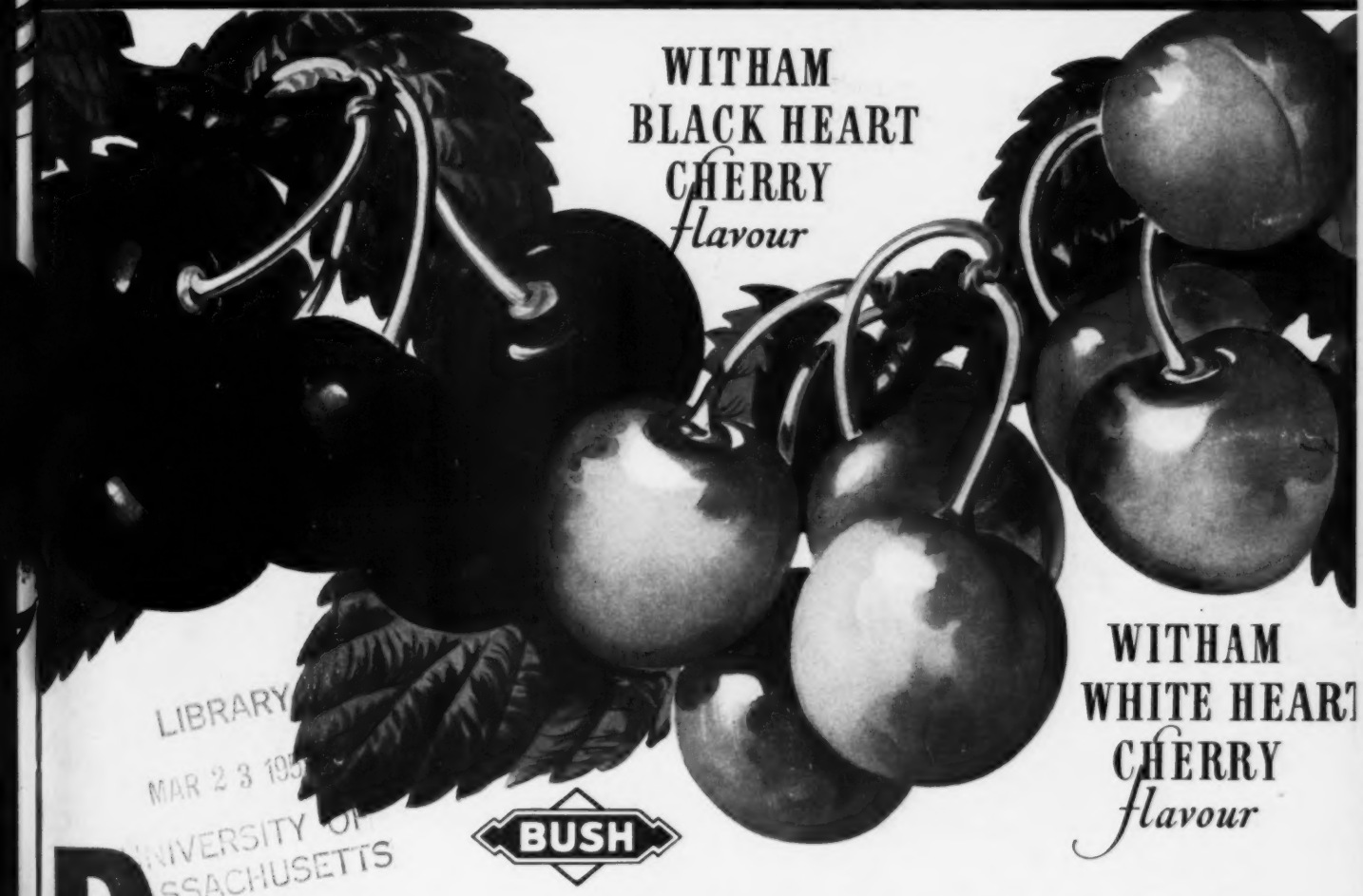
FOOD MANUFACTURE

Incorporating Food Industries Weekly

A PUBLICATION OF THE LEONARD HILL TECHNICAL GROUP 34:3 MARCH 1, 1959



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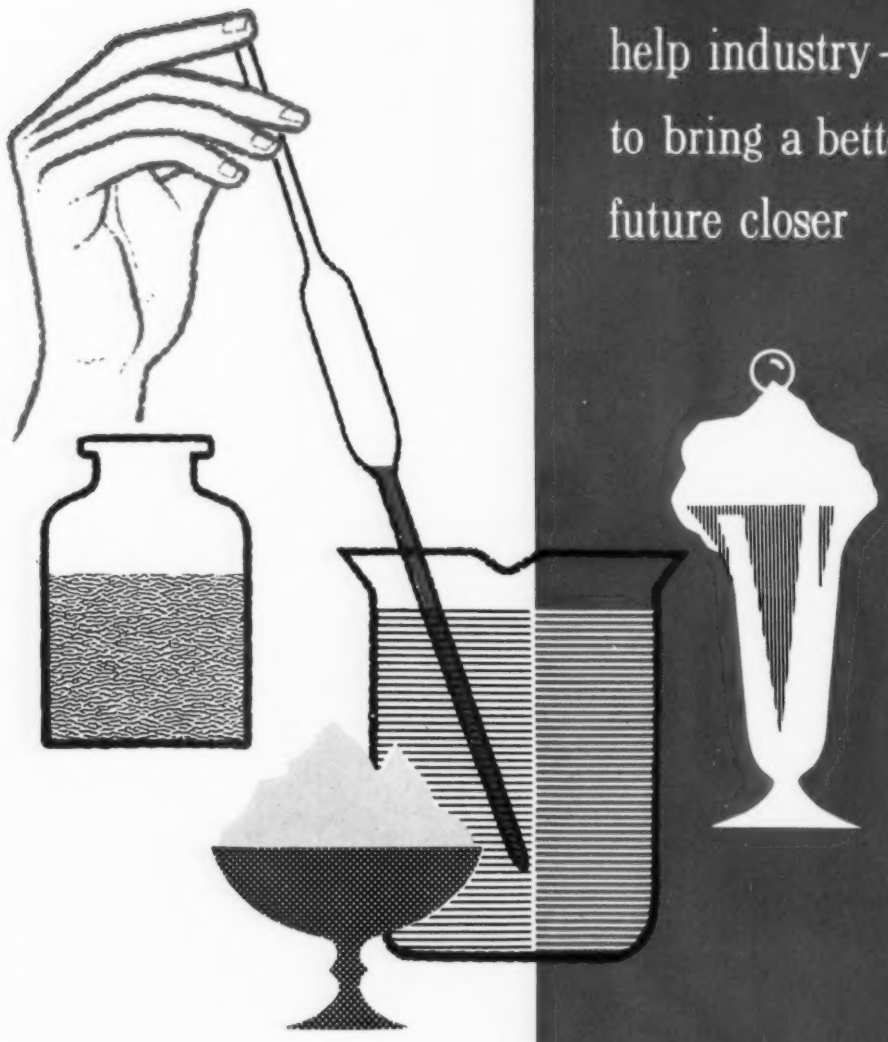

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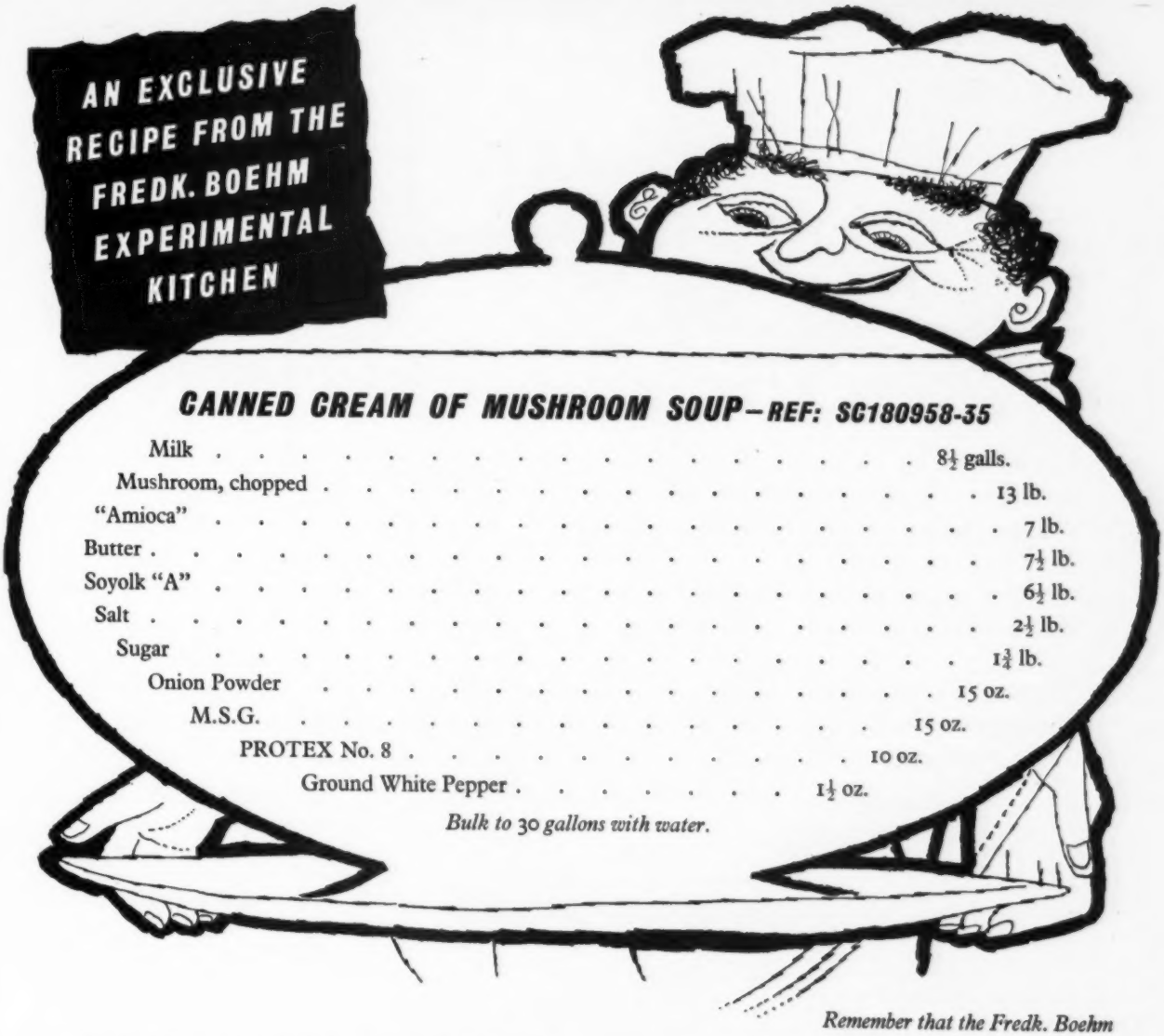

CANNED CREAM OF MUSHROOM SOUP—REF: SC180958-35

Milk	8½ galls.
Mushroom, chopped	13 lb.
"Amioca"	7 lb.
Butter	7½ lb.
Soyolk "A"	6½ lb.
Salt	2½ lb.
Sugar	1¾ lb.
Onion Powder	15 oz.
M.S.G.	15 oz.
PROTEX No. 8	10 oz.
Ground White Pepper	1½ oz.

Bulk to 30 gallons with water.

Mix the dry ingredients with sufficient milk to form a smooth paste. Add the chopped mushrooms and the remainder of the milk and bulk to 30 gallons with water. Bring to the boil, simmer for 5 minutes then fill hot into plain No. 1 Tall cans. Seal and process for 1¼ hours at 240°F. Water cool.

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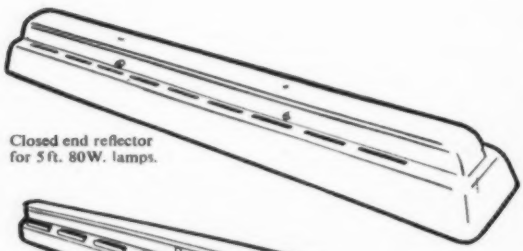
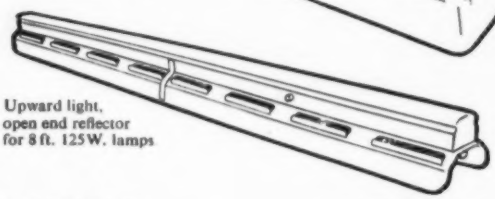


Closed end reflector for 5 ft. 80W. lamps.



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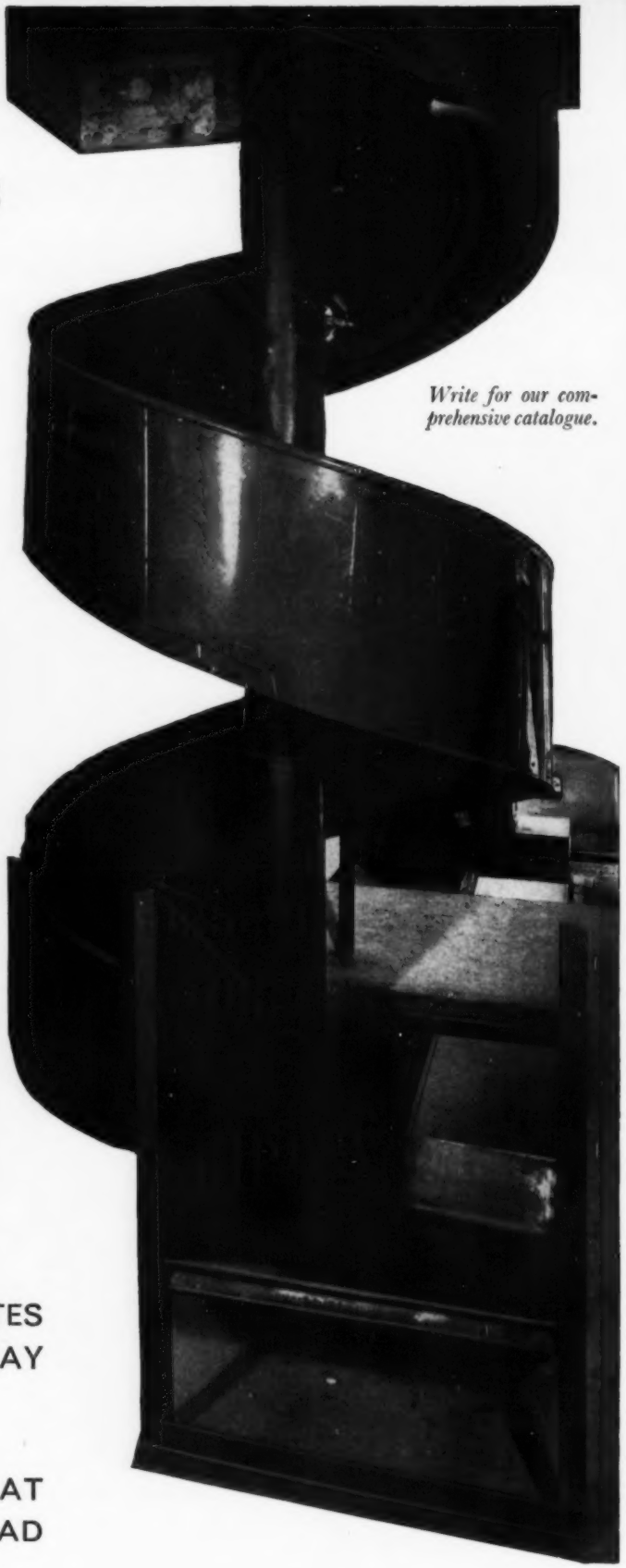

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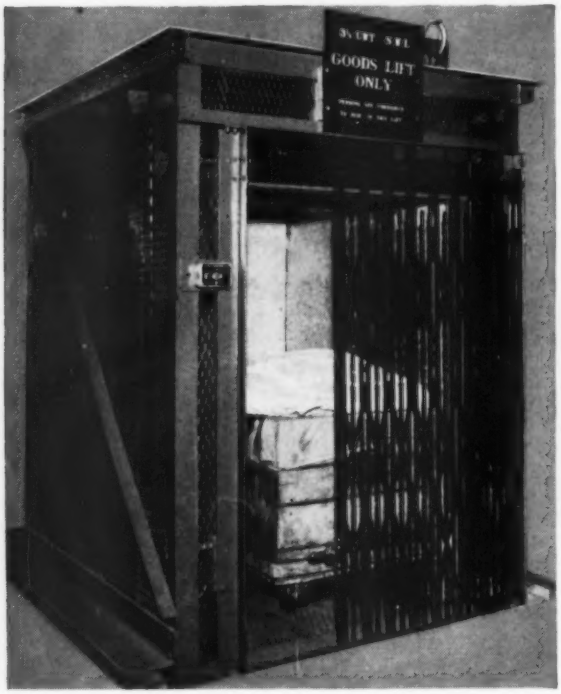

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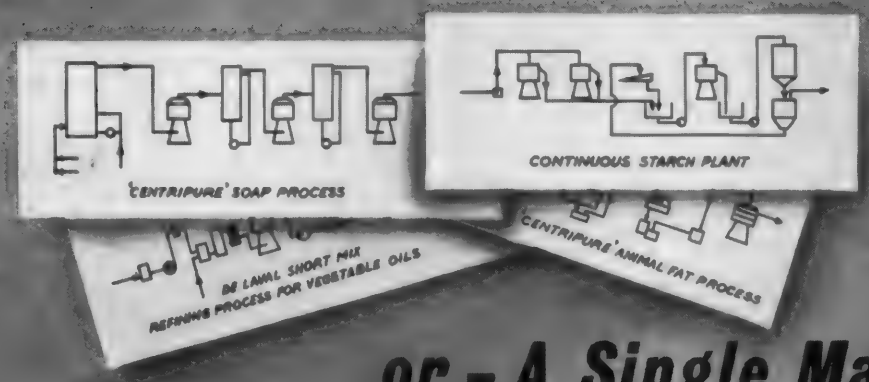

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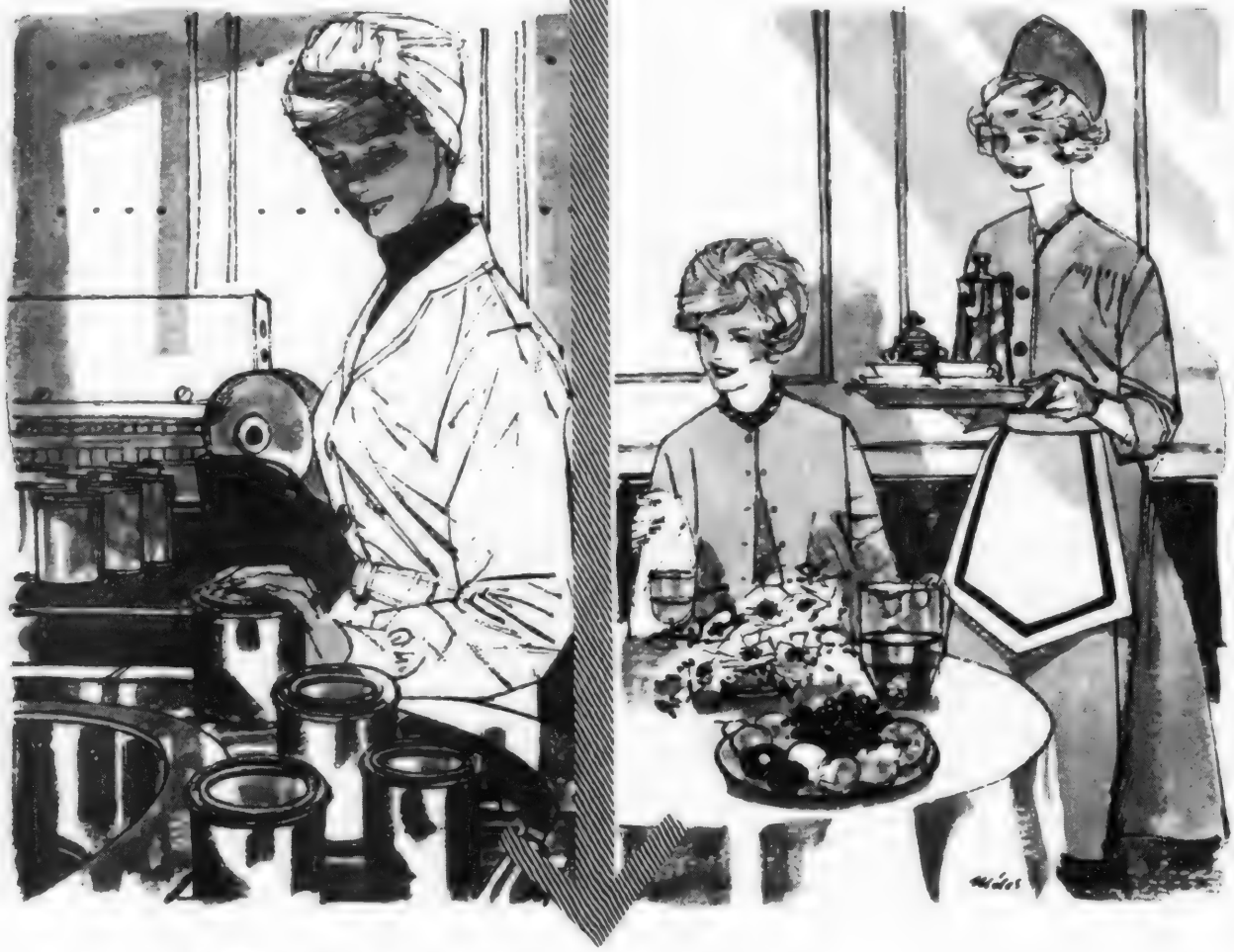

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The Packaging Manager is crazy about

LASSO No. 76 Vinyl Tape

The man's in love with the stuff. Talks of nothing else. Mellifluous phrases roll off his tongue . . . interminably. "Amazing pliability," he says . . . "Water-proof and moisture-vapour proof," he shouts . . . "Pressure sensitive adhesive tape with exceptionally long storage life . . . !" One can stand just *so* much!

SEALING MACHINES DEMONSTRATED The Lassotape Machinery Service offers a complete range of sealing machines — from hand operated dispensers to automatic machines. If you would like to see these efficient sealers and have the advice of a package sealing expert, write, without obligation, for our travelling demonstration unit to visit you.

For further information on Lasso No. 76 Vinyl Tape and other Lassotapes for the packaging industry, write to the address below.

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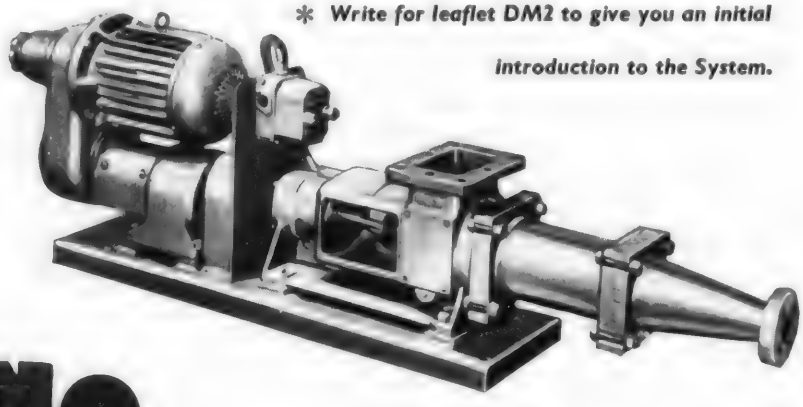
A service is available to offer advice on this subject whether it be for small or large systems.



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MP 302/L12600

The Packaging Manager is crazy about

LASSO No. 76 Vinyl Tape

The man is like a gramophone. Trouble is he only has one record and he won't run down. Never stops talking about Lasso No. 76 Vinyl Tape. "Amazing pliability," he says... "Waterproof and moisture-vapour proof," he says . . . "Pressure sensitive adhesive tape with exceptionally long storage life," he says, he says, he says, he says...

SEALING MACHINES DEMONSTRATED The Lassotape Machinery Service offers a complete range of sealing machines—from hand operated dispensers to automatic machines. If you would like to see these efficient sealers and have the advice of a package sealing expert, write, without obligation, for our travelling demonstration unit to visit you.

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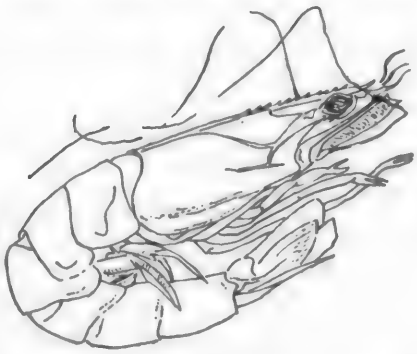
You simply can't afford to be without...



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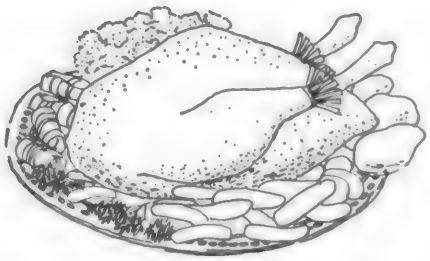
which adds new magic to flavour



Whether food is raw, cooked, dried, canned or frozen, AJI-NO-MOTO brings out—*like magic*—the full, characteristic, tempting flavour. Whether the food goes to the Far North or the Deep South, AJI-NO-MOTO keeps its flavour strength. AJI-NO-MOTO goes straight to work on the flavour in food, strengthening weak flavour, drawing out hidden flavour, restoring lost flavour.... And it is very economical! Only 5 lbs. of AJI-NO-MOTO gives new richness to 900 gallons of soup! Ask us for interesting colour literature.... A test sample, too, if you want it.

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The Packaging Manager is crazy about

LASSO No. 76 Vinyl Tape

"Lasso No. 76 Vinyl Tape"— that's all they ever hear from him. They asked him to stop, but he can't. The man's obsessed with the stuff. "Amazing pliability," he said . . . "Waterproof and moisture-vapour proof," he droned . . . "Pressure sensitive adhesive tape with exceptionally long *storage* life." *That* put the lid on it!

SEALING MACHINES DEMONSTRATED The Lassotape Machinery Service offers a complete range of sealing machines—from hand operated dispensers to automatic machines. If you would like to see these efficient sealers and have the advice of a package sealing expert, write, without obligation, for our travelling demonstration unit to visit you.

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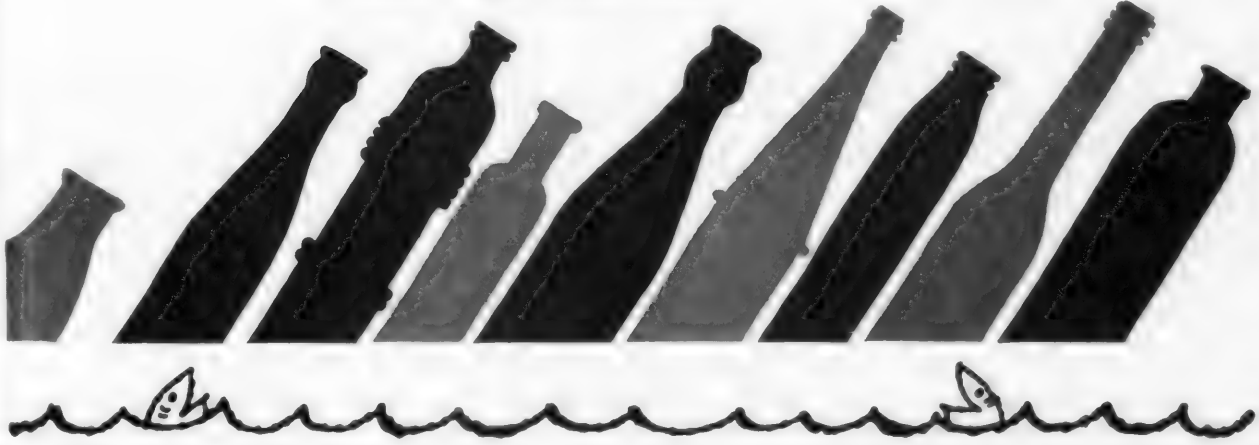

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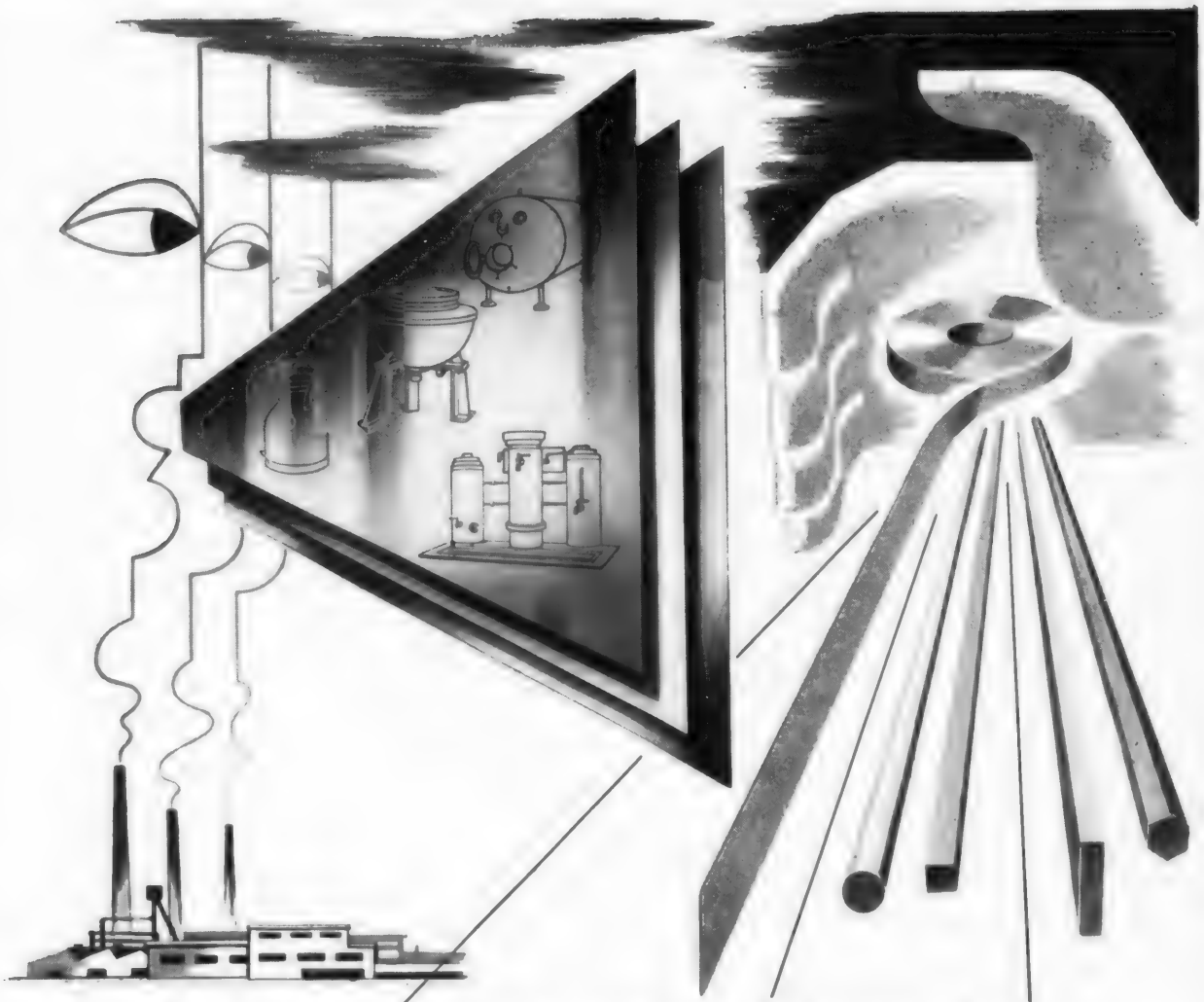

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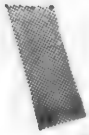

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Gosheron's NEW Automatic Carton Sealing Machines

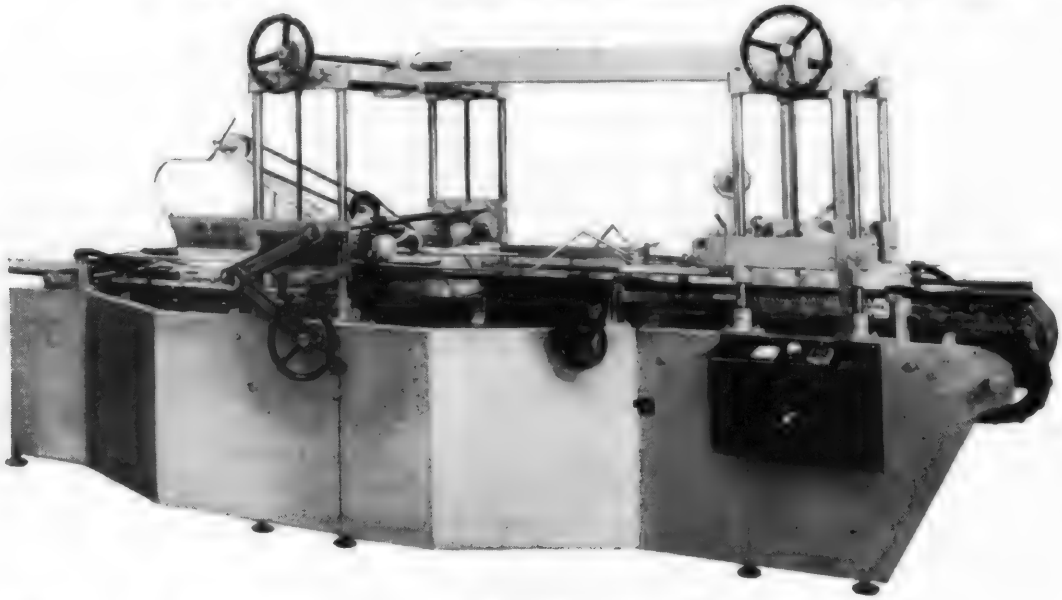
All accommodate a wide range of carton sizes.

Quickly adjustable for carton sizes.

Automatic indexing mechanism for easy flow.

Hot wire device for clean, straight cut.

Musketeer Mark I **7′ 6″ x 4′ Taping unit only.**
Pictured in use at William Teachers' Glasgow Bond.



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Musketeer Mark II **14′ 4″ x 5′ 6″**
Prototype flap glueing and taping machine.

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John Gosheron & Company Limited, The Packaging & Industrial Tape Centre (Regd.)

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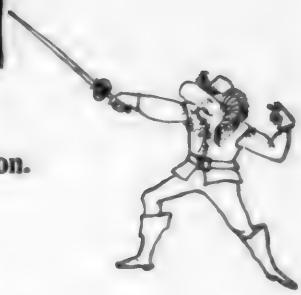

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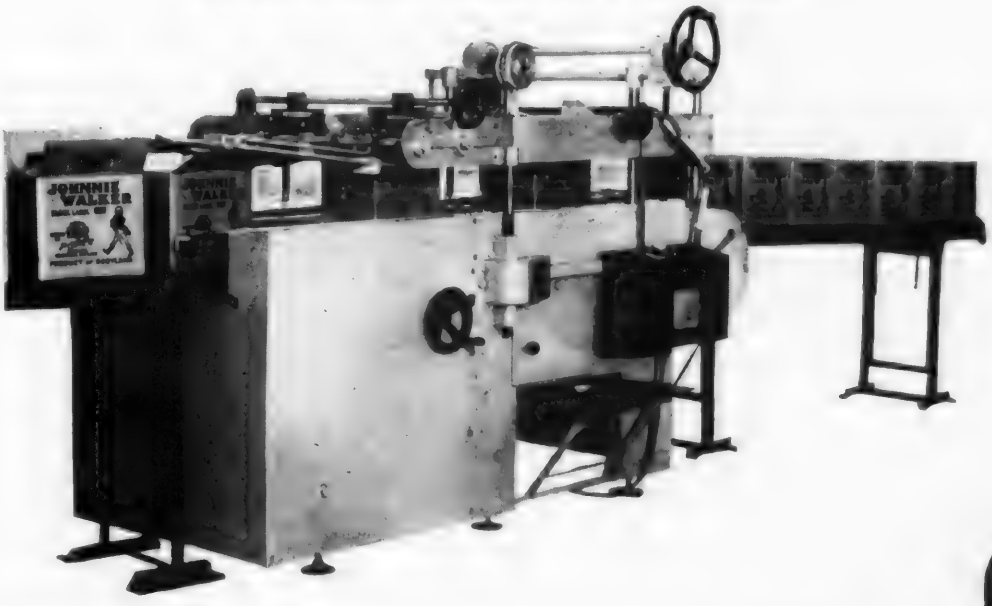

Musketeer Mark III **8′ 4″ x 4′ 3″ The latest space-saving combined glueing and taping machine. Pictured in use at Johnnie Walkers Kilmarnock Bond.**

Seen here toasting his many trade friends is Mr. R. A. Goodwin, Gosheron's Area Manager for Scotland, D'Artagnan to the Three Musketeers and the first salesman to pioneer self-adhesive tapes to the Scotch Whisky Industry.

Patent Hand Carton Sealers also available

Gosheron *can tape it*

All these machines can be demonstrated in Scotland
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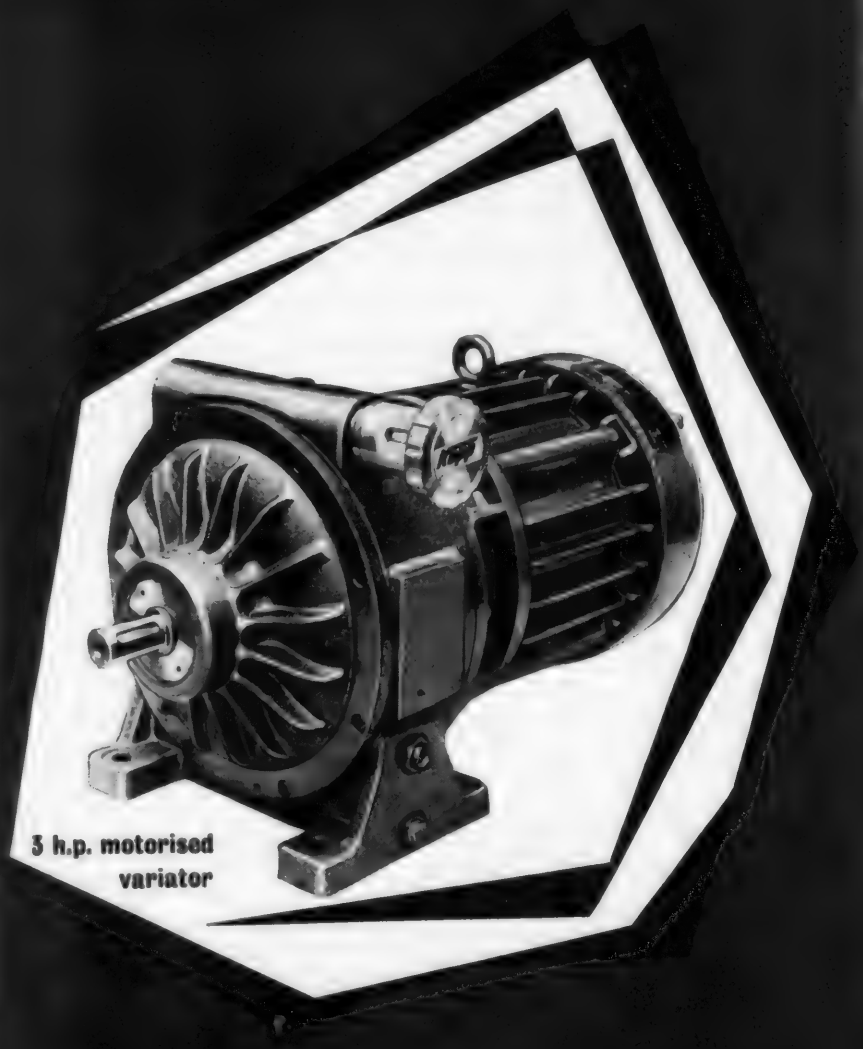

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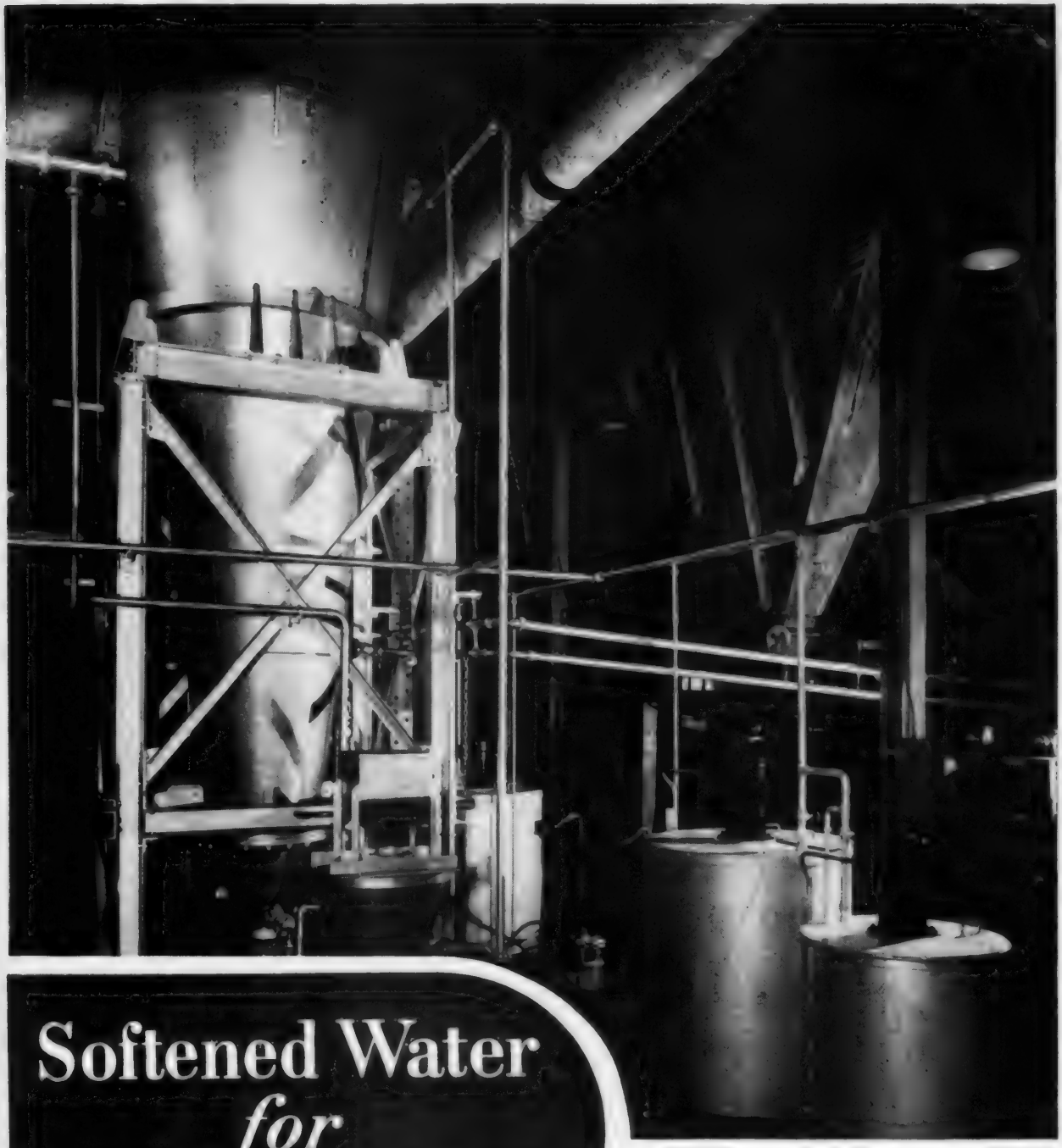

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Colour printed METATHENE

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THE MB VACUUM DRAWING AND POCKET SEALING MACHINE

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to lighten the complete unit, to reduce overall size, to extend the range of sizes and to lower the price

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achieve this objective and provide all the advantages of Saunders construction:—

Isolated mechanism
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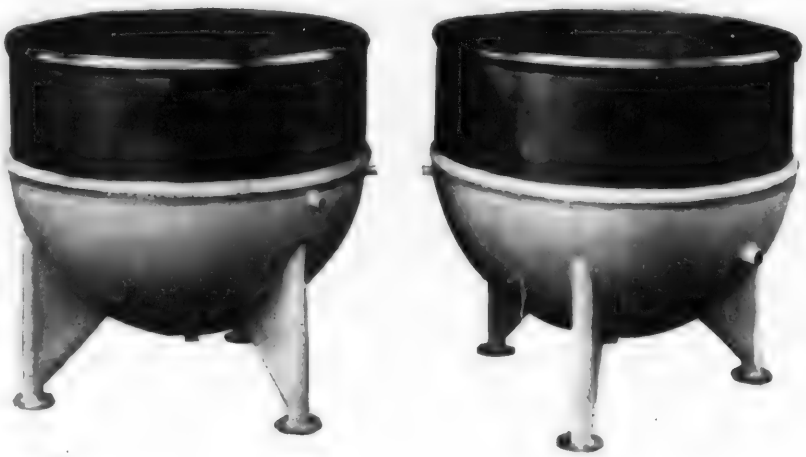

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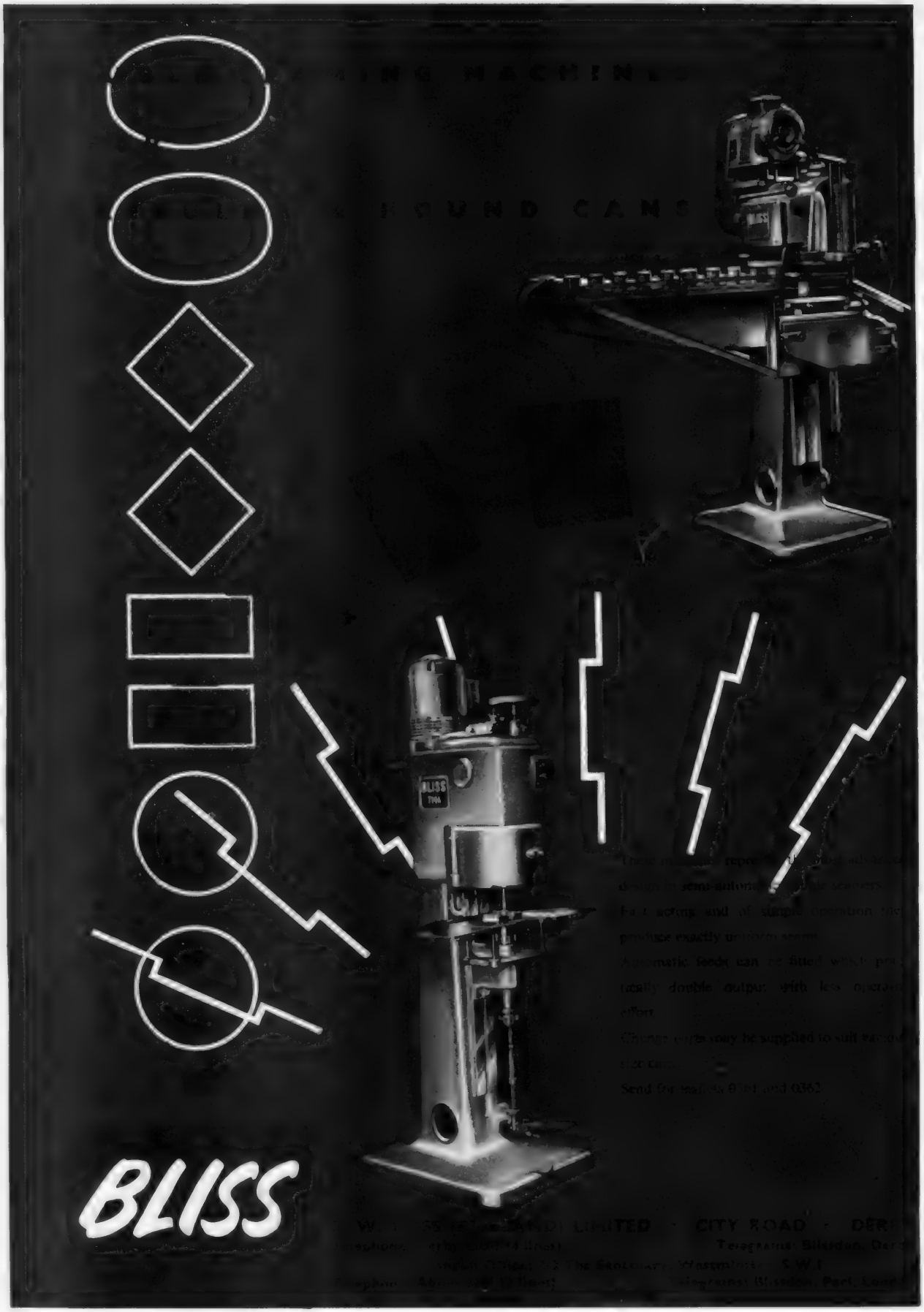
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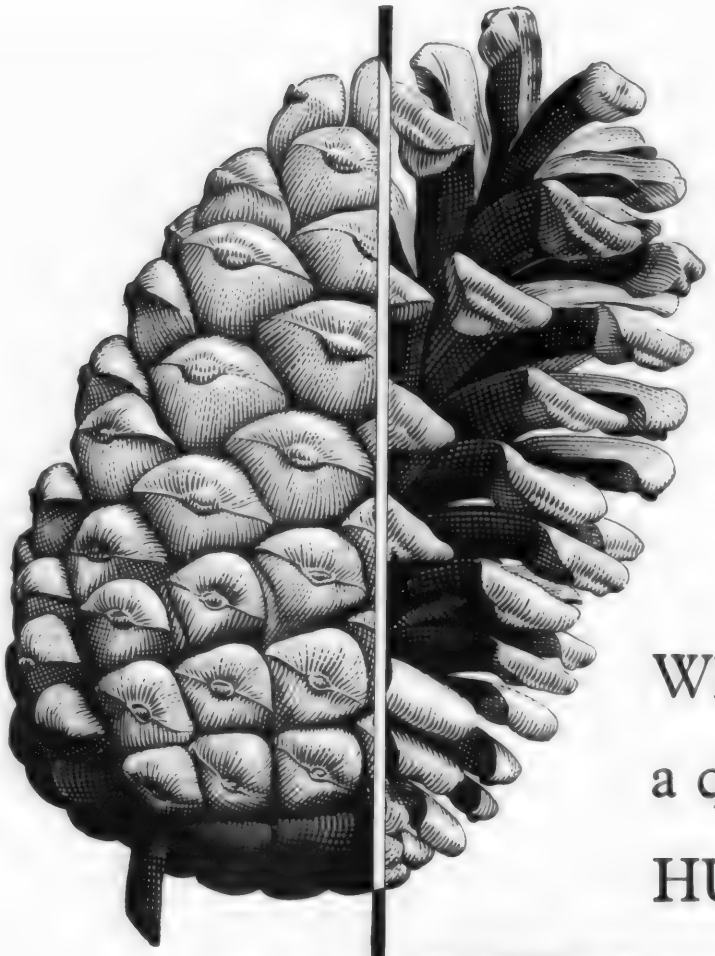

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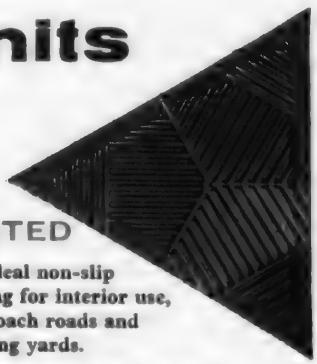

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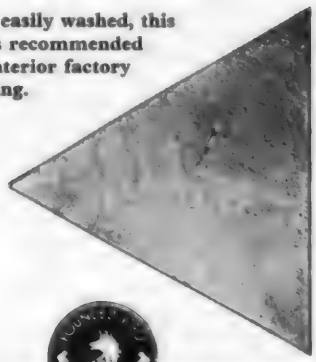

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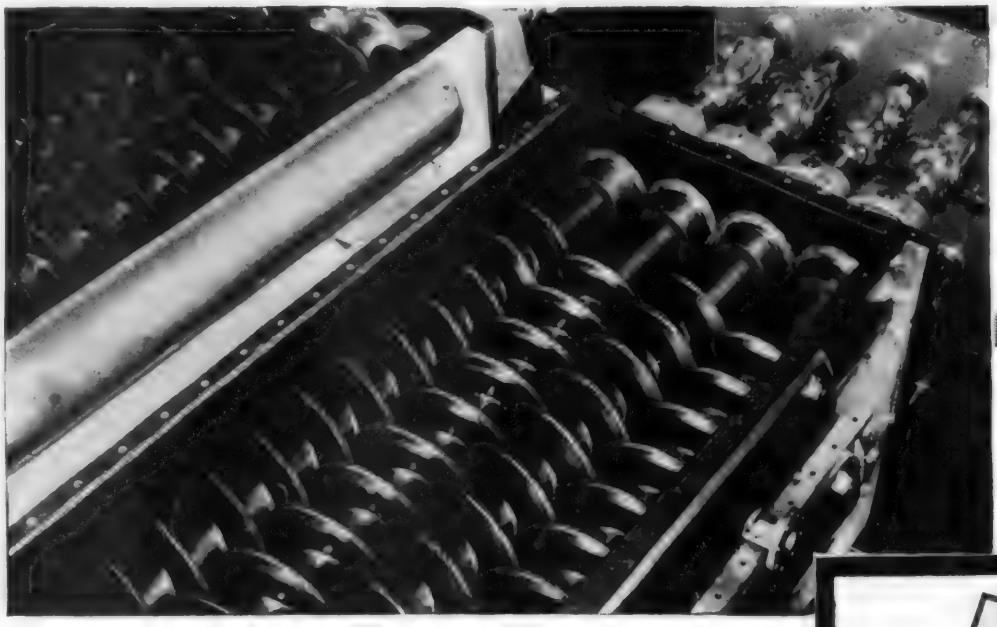

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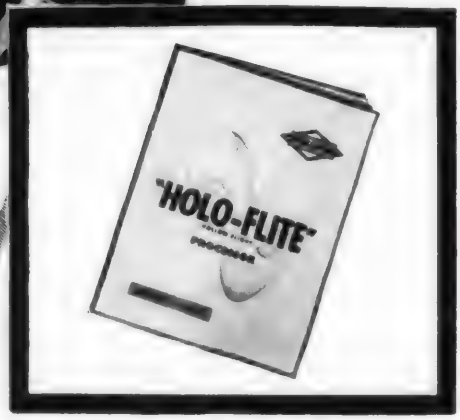

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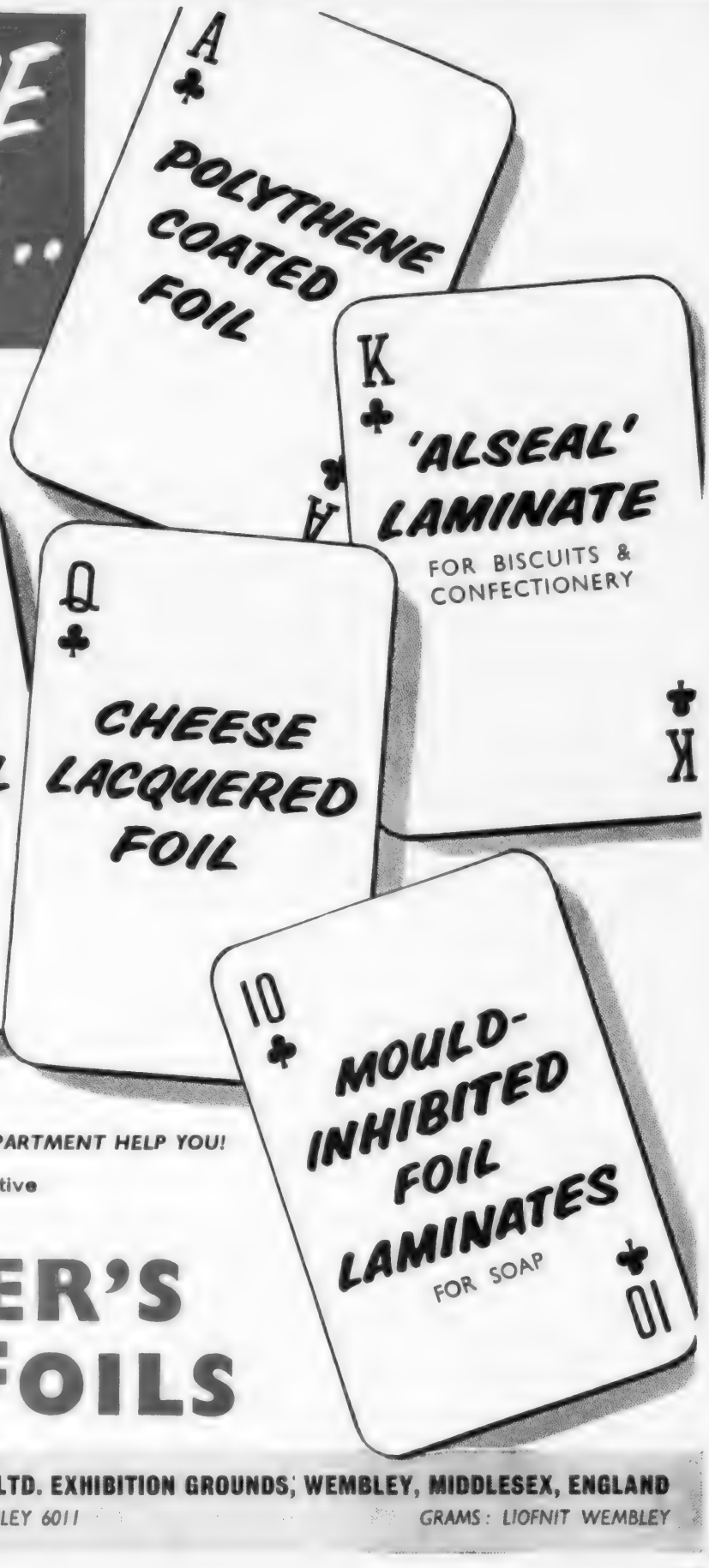

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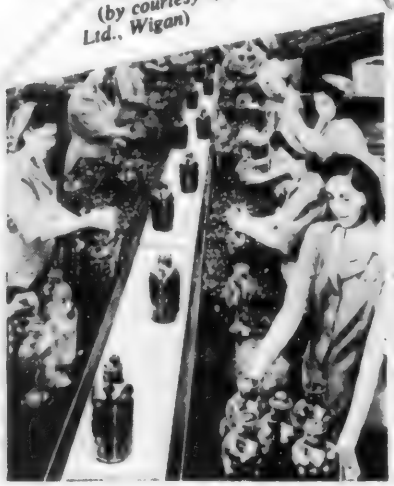
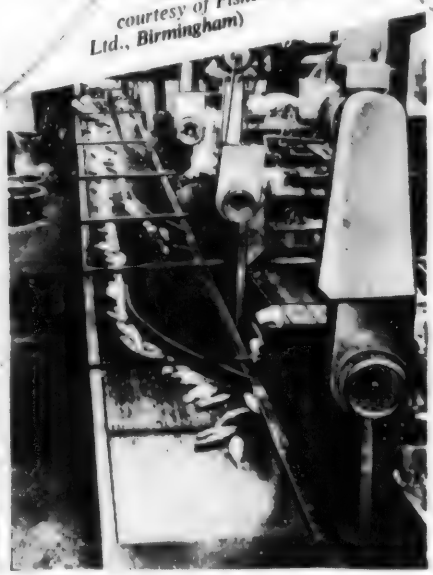
Cake packing on a 'Motaveyor' (by courtesy of Knightsbridge Cake Limited, Manchester)



Fruit bottling on a 'Motaveyor' conveyor (by courtesy of J. Mawdsley Ltd., Wigan)



Scandura conveyor in a fish canning factory (by courtesy of Fisher & Ludlow Ltd., Birmingham)

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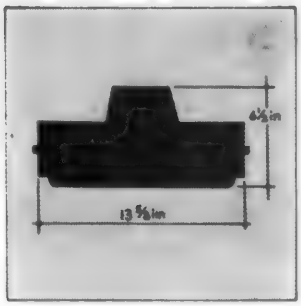

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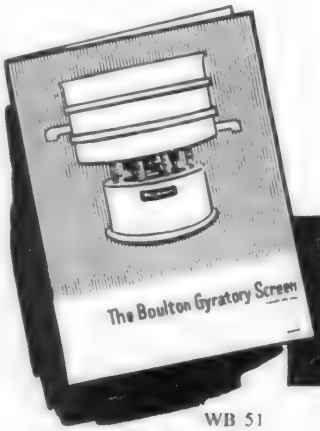

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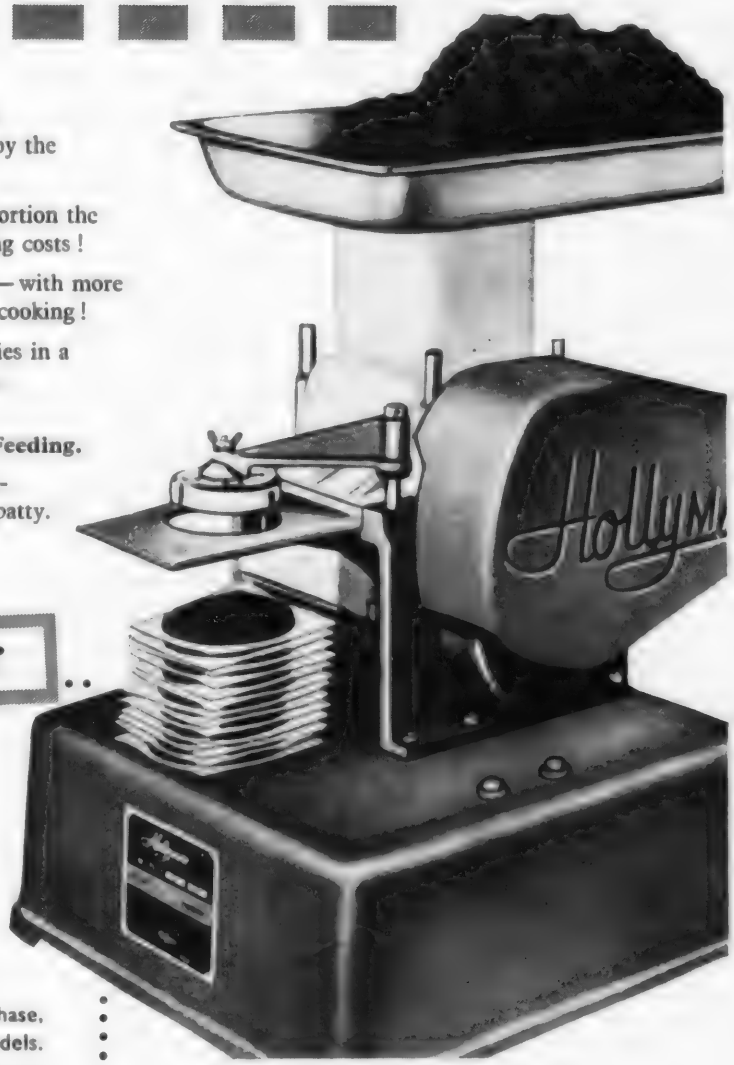

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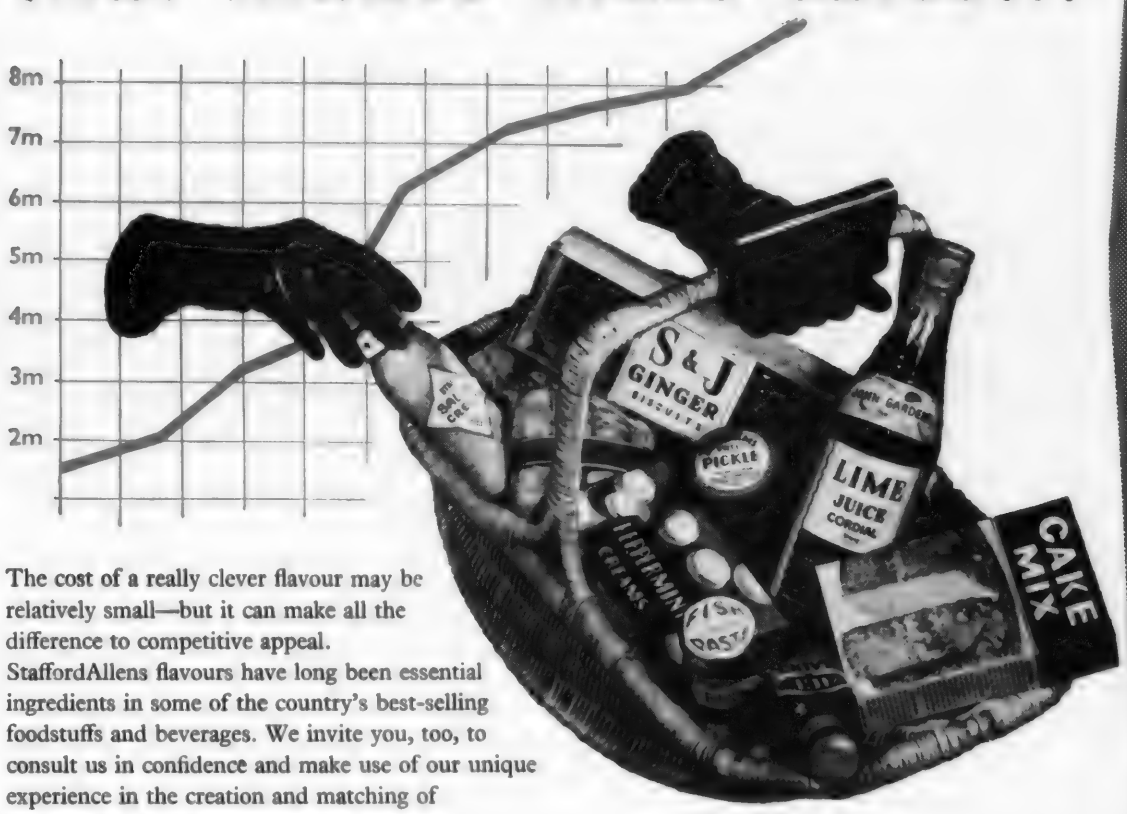

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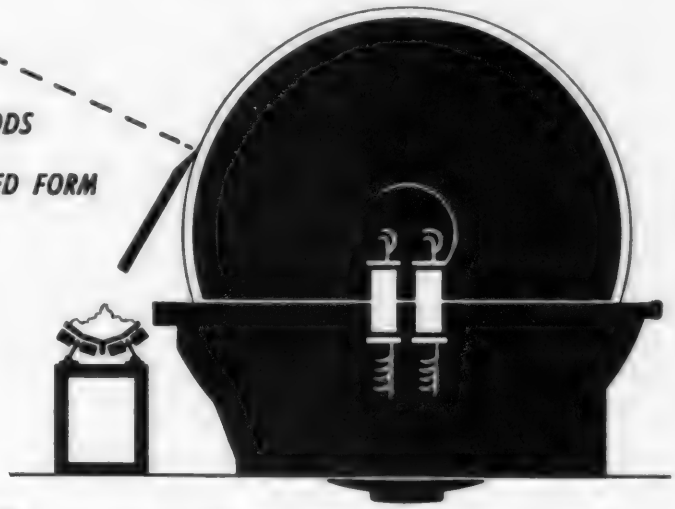

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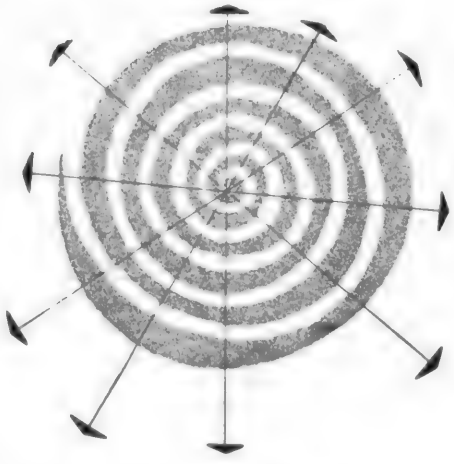

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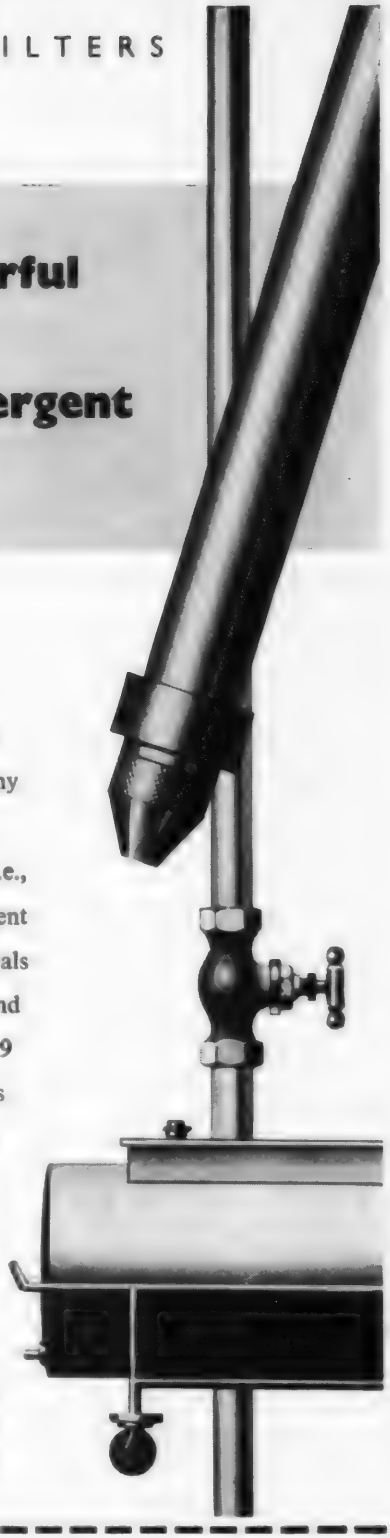

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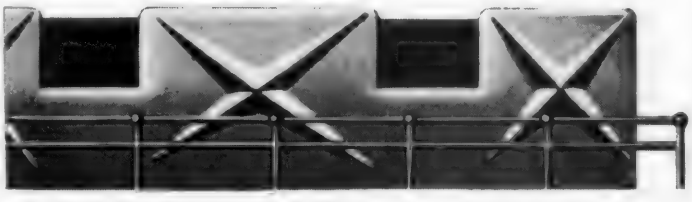

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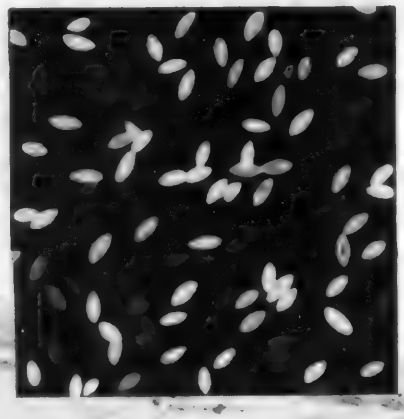

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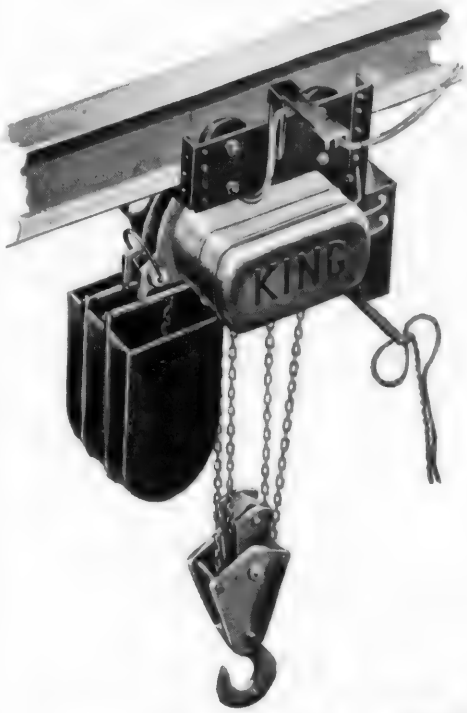

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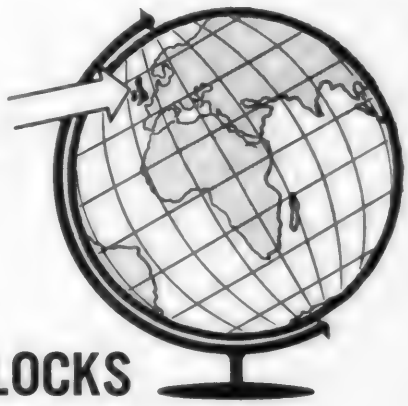

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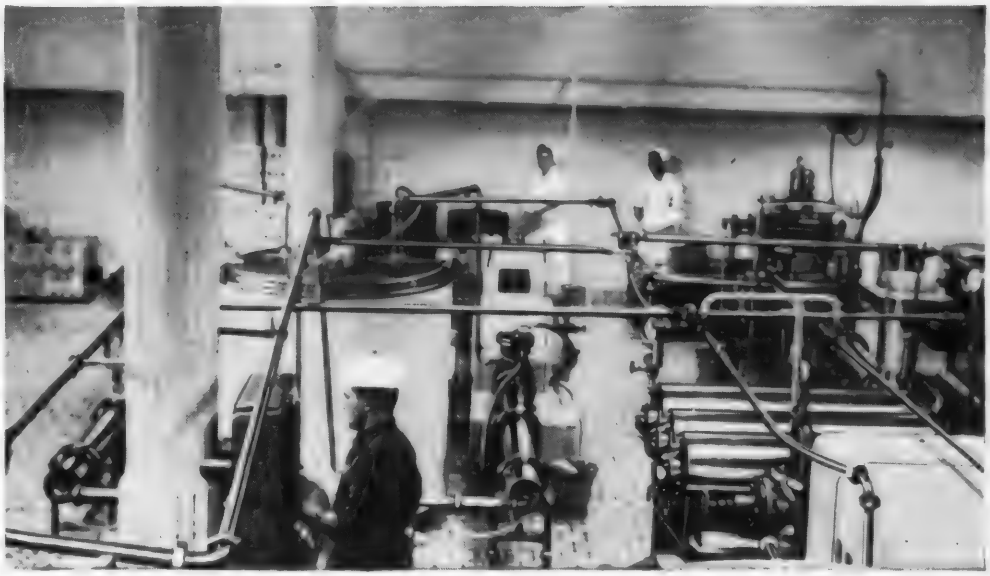

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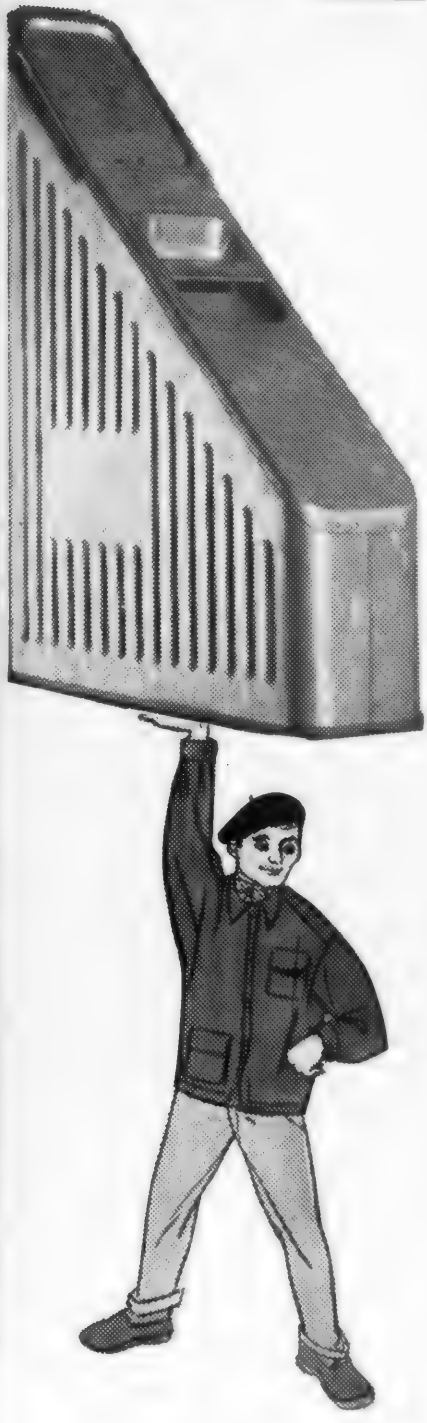

Charbonnages de France (the French coal authority) have found a clean, easy way to deliver coal—by packing it in corrugated sheet steel. This pack is a triangular jerrican holding 33 pounds of coal. The coal is delivered in the can, to be tipped from it straight into the stove or grate, thus avoiding the dusty, dirty shifting of coal from sack to cellar to scuttle to fire.

"BULLY"

This is only one example of the versatility of sheet steel as a packaging material. Ever since the early 19th century tinplate (which is sheet steel with a protective coating of tin) has been the premier pack for food. Without such stand-bys as bully-beef and dried milk, Great Britain would have been starved out by the rigorous blockades of two world wars. And today, despite much competition from new materials, tinplate maintains its pre-eminence as a food pack. No less than 3,500 million cans of food were marketed last year. There isn't a larder in the country that doesn't contain half a dozen tins "just in case."

THE FUNCTIONS OF THE IDEAL PACK

Food, being highly perishable, needs efficient protective packing to retain freshness. That is where tinplate comes in. More than any other material, tinplate fulfils all the functions of the ideal pack.

Tinplate affords complete and permanent protection to the product against climate, contamination and decay (a tin of beef 87 years old has been opened and found perfectly fit for consumption).

Because tinplate takes colour-printing as brilliantly as art-paper it is an excellent medium for establishing product identity. This characteristic of tinplate is increasing in importance as the popularity of supermarkets increases.

But the advantage of a tinplate pack most attractive to traders and the buying public is its convenience. A tin is easy to transport, easy to handle, easy to store, easy to open and easy to dispose of. For all forms of perishable goods, tinplate as a pack has no equal.

TINPLATE—THE PACKAGING MATERIAL OF THE FUTURE

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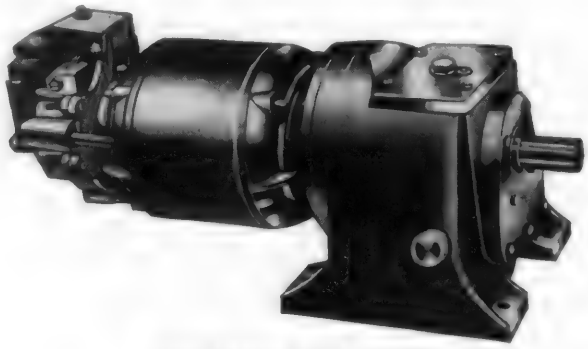

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FOOD MANUFACTURE

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INFORMATION BULLETIN

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MAIZE

The fruit of the maize plant consists of a large number of seeds arranged around a fleshy stalk which forms the cob. It is believed to have originated as a hybrid, since, in contrast to most of the common oil seeds the origin of which can be traced back into far antiquity, maize was first mentioned as late as the middle sixteenth century.

Maize Oil, the most prolific to be obtained from any cereal, is golden yellow in colour, and practically all of it is found in the germ, which is separated from the seeds as a by-product in the manufacture of maize starch and glucose syrup. It remains liquid at ordinary temperatures, although it gives a small deposit of stearine in cold weather.

COTTON SEED

Grown in South America, India, China, Russia, the Sudan and Uganda, by far the largest producers of cotton seed are Egypt and the U.S.A.

The cotton plant grows about 3 feet high and bears flowers of various colours from white to red, depending upon the type. The flower develops into a "boll" containing the seeds, to which are attached the fine white cotton fibres.

The dark brown or black husk accounts for some 40 per cent of the total weight of the seed, and, since it contains practically no oil and has little feeding value, it is sometimes separated from the "meat" before the oil is removed. The whole seeds contain about 20 per cent of a dark coloured liquid oil which deposits solid stearine on standing. This oil can be hydrogenated for some purposes.

SOYA BEANS

The soya bean has been cultivated in China and Japan beyond written record. Today, the soya bean is grown extensively in many countries, notably Manchuria and the United States, where some 40 million acres are devoted to its cultivation.

The whole fruit consists of a hairy pod containing the yellow seeds, which are about the shape and size of a pea. The oil content is only about 18 per cent and is usually removed by the Solvent Extraction process.

Soya Bean Oil is liquid at ordinary temperatures, and, besides being used extensively after refining as an edible oil, its semi-drying properties make it ideally suited for the manufacture of alkyd-resins for paints, particularly in the U.S.A. Again Soya Bean Oil can be hydrogenated for certain uses.

WHALE OIL

Whale Oil comes from various parts of the Baleen Whales, of which Blue Whales, Finnbacks, Sei Whales and Humpbacks are the chief species. Before the introduction of the factory processing ships the whales had to be towed considerable distances to shore stations, where the blubber was removed and rendered. The quality of oil so produced was very poor owing to the decomposition which occurred between killing and processing. Nowadays, however, the whale is processed almost immediately it is killed and the oil is of a much better quality. The best grades are rendered at low temperatures and the lower grades are produced from the residues in pressure digesters at much higher temperatures.

Whale Oil can be stored in large quantities for long periods without deteriorating if properly prepared. It throws out a stearine at low temperatures and may even become semi-solid. Before it can be used for edible purposes Whale Oil must be hydrogenated.

PERCENTAGE FATTY ACID COMPOSITIONS—AVERAGE VALUES

Fatty Acid	Maize Oil	Cotton Seed Oil	Soya Bean Oil	Whale Oil
Myristic	—	Traces	Traces	11
Palmitic ..	8	22	9	17
Stearic ..	4	2	4	3
Arachidic	Traces	Traces	Traces	Traces
Oleic ..	46	30	28	—
Linoleic ..	41	45	52	—
Linolenic	—	—	6	—
Unsaturated	—	—	—	60*

* (These unsaturated acids are a mixture of many acids ranging in length from C_{14} to C_{22} many of which have varying degrees of unsaturation.)

LN 50-8058

FOOD MANUFACTURE

Vol. XXXIV, No. 3 March 1, 1959

Plenty of fish in the sea?

OPENING a conference of 14 European countries to consider a fishing convention, the Minister of Agriculture and Fisheries warned that these countries might fish themselves out of business. Such warnings have been made repeatedly over the past years, but what is done? The powers argue acrimoniously round the conference table while the trawlermen continue to take fish full of roe and to use nets of undersize mesh.

Let it be said that the latter practice is confined to foreign trawlers. We were recently told at Grimsby of a near-record catch which had been landed by a Grimsby trawler, but was this a catch of which to be proud? "In years gone by," our informant said, "the skipper would have deserved to be hanged." The fish were full of roe. At one time it was an unwritten rule that fish were not taken until they had shot their roe, but now that rule seems to have gone overboard. The trawlermen are the last to be blamed; probably more than anyone they understand the true situation, but how can our fishermen be blamed when foreign and pirate trawlers fish to their heart's content heedless of any convention?

It is a paradoxical situation that at a time when the fish processing industry in this country is making substantial progress, its source of raw material is in danger of drying up. Of what use are the new plants and the new processing and packaging techniques if in a few years there will be no fish to process? There is enough and to spare for everybody on this planet, but it is a question of fair shares for all and the application of a little bit of common sense. How rare this latter commodity is among humanity in the aggregate! Nature's resources when conserved yield a hundredfold, when plundered they disappear.

The result of the convention is that a pact has been signed by the representatives of 10 countries in which there is provided a means for conserving the fish stocks and, at the same time, exploiting on a rational basis the fisheries throughout the north-east Atlantic and its dependent seas, excluding the Baltic.

No details of the measures have been worked out, but a spokesman of the fisheries department of the Ministry of Agriculture and Fisheries said that they would include closed seasons, closed areas, and regulations on the size of mesh for nets and the size of fish. The agreement awaits ratification by several countries.

This new agreement, which replaces the convention of 1946 in which provision was made for limited measures for the conservation of certain fish, can only be described as a step in the right direction, and it is to be hoped that all the parties concerned will abide by it.

Troubled waters at Teddington

SUFFICIENT time has now elapsed since the announcement of the D.S.I.R.'s decision to wind up the microbiological group at the National Chemical Laboratory, Teddington, for an assessment to be made of its wisdom; the first impression that a blunder had been committed has indeed been confirmed by reactions in industry. "To whom shall we now go?" is the general theme. It is all very well for the D.S.I.R. to say that the work of the group can be entrusted to the universities, but much of the work is of a long-term nature extending, in some cases, over ten years or more. How many workers spend that length of time in a university research department? The vast majority are more concerned with acquiring a doctorate, which takes much less time. Is this one of the considerations which has led the D.S.I.R. to award longer term grants for special researches? These grants, which have normally been limited to a maximum of five years, may now be given for an initial period of up to seven, with the possibility of continuing support for a further ten.

By its original announcement, presenting its decision as a *fait accompli* which took by surprise not only the world of industry but also the members of the group themselves, the D.S.I.R. deprived itself of any face-saving alternative course of action. Its acceptance of the recommendations of the Steering Committee, the members of which are not civil servants, in such a confident fashion shows unusual abandon for a Government department. The fact that it is in no hurry to implement the decision, and that the members of the group are continuing their work, may indicate that the D.S.I.R. is having second thoughts in the matter.

Milk bottle troubles

AN investigation into the best method of packing milk, made after the discovery of glass splinters and complaints about damaged and dirty bottles, has convinced Norfolk County Council's protection committee that the glass bottle is still the best container but that it can be much improved. The committee agree that milk cartons eliminate the danger of glass splinters and remove the need to rinse and collect empty bottles, but feel that these advantages are heavily outweighed by such considerations as the impossibility of obtaining absolute manufacturing perfection, the likelihood of mould growth caused by imperfect waxing, susceptibility to damage in transit, ease of pilfering, difficulty of sterilisation, slower filling rate, and, what housewives dislike, invisibility of the cream line.

Generally speaking, creameries carry out their duties well and serve their customers very efficiently. Smaller concerns, so the committee say, sometimes lag behind in machinery and so suffer more by misuse of bottles by the consumer. The trade would greatly benefit by steps to educate the consumer to return bottles without delay in a clean and undamaged condition.

Two bottle sizes are in use, of 35 and 38 mm. neck diameter. Where two creameries use bottles of different size, there is a possibility of the bottles being mixed up and fed to the wrong filling and capping machine; when this happens, splintering of the neck is certain to occur, and an important step towards eliminating this would be the standardisation of bottle sizes.

The committee have rejected plastic milk containers on account of their lightness and instability on conveyor systems. The glass from which some bottles are made leaves much to be desired, and a standard specification for toughness and durability, which the British Standards Institution's requirements for milk bottles do not cover, would be welcome. Conclusions are that the bottle is still the best container for milk, but that steps should be taken to standardise sizes, or at least the neck diameter, that standard toughened glass should be used, and that publicity be promoted to make the consumer conscious of his responsibility in returning used bottles promptly clean and undamaged.

Glass industry's confidence

WHILE on the subject of bottles, it is interesting to learn that two-thirds of glass containers made in this country are destined to hold products of the food and drinks industry. To what extent is the glass industry being affected by the rapid rise of new packaging materials? Not much, if those in the industry are to be believed. The old-fashioned bottle still remains a solid favourite for many traditional products, and is not likely to be displaced for a long time to come, if ever. Glass has many advantages; it is hygienic, non-corrodible, and non-toxic, can be made transparent or otherwise according to demand, it can be fashioned into the most delicate and exotic shapes to attract the sophisticated, it is re-usable, and, when treated with respect, permanent. It can withstand pressure or vacuum, and is cheap. Small wonder that, with the exception of paper, it reigns supreme over other packaging materials. One has the impression that new packaging materials are finding new markets for products as well as invading old; a case in point is canned beer; how many confirmed beer drinkers now buy their beer in cans who formerly bought it in bottle or drew it from the wood? Perhaps we should find cans of beer in picnic baskets where before there were bottles of squash and vacuum flasks of tea. It would be interesting to know.

It has been said that the rise of competitive packaging materials has dented the edges of the glass industry's still expanding market, and nothing more. Certainly, when a well-known member of the industry can increase its share capital by a further £1 million, it shows that the trade is not at all depressed by new developments.

The mystery of the glen

"THE haggis does not lead a lonely, hunted existence, nor does it emit piercing, blood-curdling screams when trapped. The female of the species does not deliver 11 litters each year, nor is she in the habit of overlaying her young. Haggis shooting was prohibited by law in 1867, and nowadays any cases of haggis poaching, when apprehended, are dealt with by special courts, each presided over by its own convenor."

Thus spake Baxters of Speyside in their invitation to sample haggis at a recent celebration of the bicentenary of the birth of Robert Burns. The haggis was enjoyed along with other delicacies made by these specialists in exotic foods, but it did raise in the minds of some of those present the question of whether the haggis is shot or trapped.

Many readers must be wondering by this time just precisely what a haggis is and, if Scots will bear with us, we will do our best to clear up this mystery which fills the breast of many Sassenachs. Haggis is in fact a member of the sausage family, and it is boiled in a sheep's stomach. Cooked offal, fat, and oatmeal, together with seasoning (pepper, salt, nutmeg, and onion), are the ingredients which are combined to form this tasty dish which should be served with mashed potatoes and mashed turnips and a glass of "mountain dew."

Radioactivity in U.S. foods

At the start of a two-year test on the radioactive content of foodstuffs carried out by scientists of the U.S. Food and Drug Administration an appeal was made for food more than 10 years old. Nearly 1,000 samples were submitted, and thus the scientists were able to assess the natural radioactive content of foodstuffs prior to the rise in atmospheric radiation caused by atomic explosions. Some of the food could be compared with the "ancient" foods recently opened at the British Food Manufacturing Industries Research Laboratories at Leatherhead, for relics of the Shackleton and Byrd Antarctic Expeditions, dating as far back as 1906, were among the specimens handed in.

Tests were carried out on vegetables, sea foods, dairy products, tea, and other miscellaneous items. The most alarming result, or so it seemed at first, was that the radioactive content of tea has increased 30 fold since 1945. Fears were soon allayed on this point when it was realised that the level was not described as dangerous and, even if it gave any apprehensions, only 17% of the radioactive content was extracted from the leaf when the tea was brewed. As might be expected, all-round increases were noticed in dairy products. Some of the sea foods, such as oysters and clams, showed a significant increase in the radioactive content.

It is reassuring, however, to hear that the F.D.A. passed vegetables, meat, fruits, and bread, concluding that there had been little or no increase in their radioactive content since 1945.

What next?

What does one do with local food surpluses? Is it ethical to use surplus milk to make umbrella handles or to provide bubble baths for film stars, when a majority of the world's population is undernourished? Be that as it may, we were surprised to learn from our associate journal, "Dairy Engineering," that powdered cheese has been recommended as a "highly efficient cigarette filter." Where else but in U.S.A.—Wisconsin to be precise—could this happen? The firm which has developed the process is reported to have claimed that the (deodorised) cheese filter removed up to 85% of the coal tar in cigarette smoke and appreciably reduced the effects of nicotine.

The research was apparently initiated to find new uses and markets for the vast amounts of cheese produced in Wisconsin. To send it up in smoke seems rather drastic. We wonder if the disposal of these edible cigarette stubs causes any special problems. Do the local mice welcome this addition to their diet, or do they find the nicotine-flavoured cheese an acquired taste? What about the gentry sometimes seen gleaning discarded stubs from the city streets? Surely their views are worth assessing by one of the public opinion research organisations.

The idea might be extended. Perhaps cheese filters could be used in factory chimneys to reduce atmospheric pollution. New industrial uses for other foods might be developed; indeed, with the flock of ideas coming along for new kinds of foodstuffs, algæ and plankton and the like, the traditional kinds of food might become an embarrassment if alternative uses have not been found. So inured to astonishment have we become in this topsy-turvy world that it does not surprise us in the least to learn that banana skins boiled in milk make an excellent shoe polish.

Billy Bunter's bulges

During the war and for some time after it, we had the impression that there were far less fat people about than formerly. Yet thanks to a rationing scheme based on sound nutritional principles, which made the utmost of a very limited supply of food, no one came to much harm and the population's general health remained excellent, even though the situation at times was harassing. Now it is plain to see that the nation's average waistline is becoming more ample, which holds good for the younger set as well as those afflicted with "middle-age spread." That the public is becoming increasingly self-conscious about it is shown by the proliferation of "slimming" diets in the press, and a spawning of books about weight reduction, the main theme of which seems to be how to lose weight without effort, either physical or moral. Anything for an easy life! Now the doctors of the School Medical Service are becoming concerned about the growing problem of the fat child, who stuffs itself with excessive carbohydrate by eating too many sweets, chocolates, iced lollies, and biscuits.

When we were young we submitted unquestioningly to a parental regime which we now see was psychologically right; a very limited but adequate supply of pocket money was supplemented with a likewise small but sufficient ration of chocolate. We thus did not associate pocket money with sweets and were not tempted to squander our precious pennies to augment the sweets we knew would be forthcoming. Superimposed on all this was a strict but not severe supervision of our spending, which eased off with advancing years. It is our firm conviction that if children eat too many sweets the blame lies fairly and squarely on the parents. But the trouble is that many parents eat too many sweets themselves!

It is easy, fatally easy, to eat too much; most prosperous citizens do, and medical opinion inclines

to the view that they would be all the better for less quantity and more discrimination in the matter of eating. This requires a certain amount of self-discipline, but he who is master of himself has the secret of wisdom. Not for nothing do all the great religions emphasise the importance of fasting; as the spirit rules the body, moral precepts have beneficial physical effects. Perhaps juvenile gluttony and delinquency, the one absurd, the other abhorrent, are not unrelated aspects of a deeper problem.

Million dollar proposal

THE interchange between temperate and tropical countries of deep-frozen produce—deep-frozen prepared food, fresh fish slices, and baby peas in exchange for deep-frozen pineapple segments, tree-ripe orange slices or diced papaya—offers enormous possibilities in world trade.

It was in 1948 that we first bought deep-frozen pineapple in a multiple, "help-yourself store" in San Francisco. The idea was taken to Malaya (where the pineapple industry was being rebuilt following its total destruction during the war) and was put to leading Chinese and European business men; a deep-freezing canning line was installed at the Canning Research Station in Johore—and what has eventuated?—precisely nothing. There is still no deep-frozen pineapple in European shops.

The American product was picked ripe, mechanically processed, carefully selected, and rapidly packed, and was perfect. It may not be generally realised that deep-frozen pineapple is superior to the imported whole fruits and to the top-grade canned product, for it is picked dead ripe, is mechanically peeled, cored, selected, and segmented, and the quick deep-freezing process preserves the cellular structure of the tissue without damage, unlike prolonged cold storage and freezing.

The whole fruit, on the other hand, has to be picked unripe or slightly unripe, it has to be very carefully handled in the field and packed in individual packings in special crates, so much so that ten times the weight ultimately eaten by the consumer has to be shipped and the loss by spoilage in transit can be enormous. That is why a pine worth, say, a nickel in the West Indies is worth a dollar or more in Europe and is at times unobtainable, whereas the deep-frozen product is never out of season, is cheap to transport, and is ideal for the restaurant trade, since it requires no preparation.

The same applies to a lesser extent to canned slices, but this product involves the needless carriage of water (syrup), of tinplate, and of the container (a box or fiberite package).

Deep-frozen pineapple is a segmented product which comes to the consumer in flat cardboard packages, just like frozen peas or sliced beans. The same could be done with orange slices picked tree-ripe, or diced papaw of the delicious Hawaiian type—the nectar of the gods.

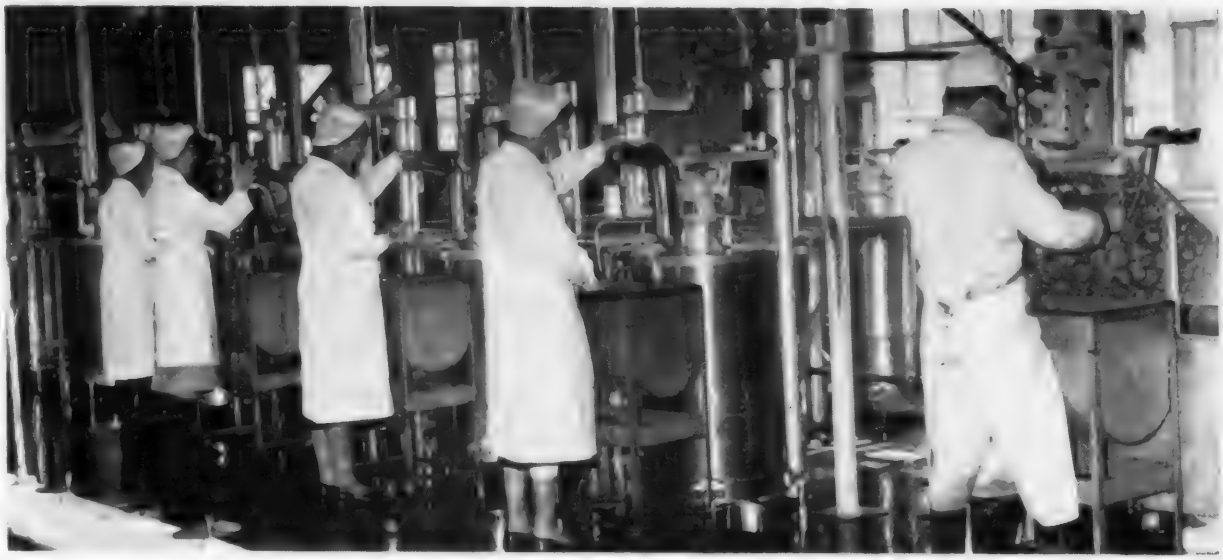
So there we have the possibilities of more trade between East and West, between temperate countries and the hot tropics—peas from London, Rotterdam, or Hamburg in exchange for deep-frozen pineapple from Singapore, Brisbane, and Jamaica; or frozen orange slices from Haifa, Durban, or Barcelona, with the same deep-storage facilities being used to take back frozen strawberries. The shipping companies need not suffer because the loss of freight will be made good by the growing two-way trade in deep-frozen foods.

A bubbling industry

THE size of the soft drinks industry in this country is now about two-fifths that of the brewing industry and is increasing steadily year by year. Annual consumption of soft drinks is something like 350 million gallons, an output which is produced by about 900 manufacturers. A large number of these are, of course, very small businesses in holiday towns where the trade is completely seasonal, but a noteworthy trend, paralleled by ice cream, is the increasing demand during the winter months. Since 1946 the annual consumption has more than doubled, and with minor exceptions caused by particularly bad weather, every year has seen an increase. In spite of the very bad summer of 1957, the record 1958 production of 331,826,000 gal. was within 4% of the 1957 record.

True to the British tradition of rugged individualism, local preferences are strongly marked and manufacturers take note of them. It seems that some communities have a sweeter tooth than others, and also prefer their drinks more strongly coloured, or less, as the case may be. In the north, herbal infusions are popular; "dandelion and burdock," for example, may sound to southern ears a curious witch's brew, but northerners take it seriously. Everywhere, however, the orange reigns supreme. One manufacturer sells ten times more orange-flavoured products than any other flavour. While "whole orange" drinks have become tremendously popular since their introduction in 1953, efforts to popularise other whole fruit drinks have been less successful, and the tonnage of fresh fruit other than orange used for beverages is, compared with orange, still minute, although increasing.

To supply the requirements of this flourishing and expanding trade, new machinery and equipment of every kind is available to help the manufacturer, both large and small; in the following pages some of this equipment is reviewed.



The convertor room in which fresh oranges are converted into "Sunfresh." The man on the right is removing a basket of oranges from the presoaking tank and emptying it into a trolley pan. On the left, oranges are being hand fed from trolley pans into convertors, which cut the fruit and extract its constituent juices and oils with warm syrup.

How Fryco's Make "Sunfresh"

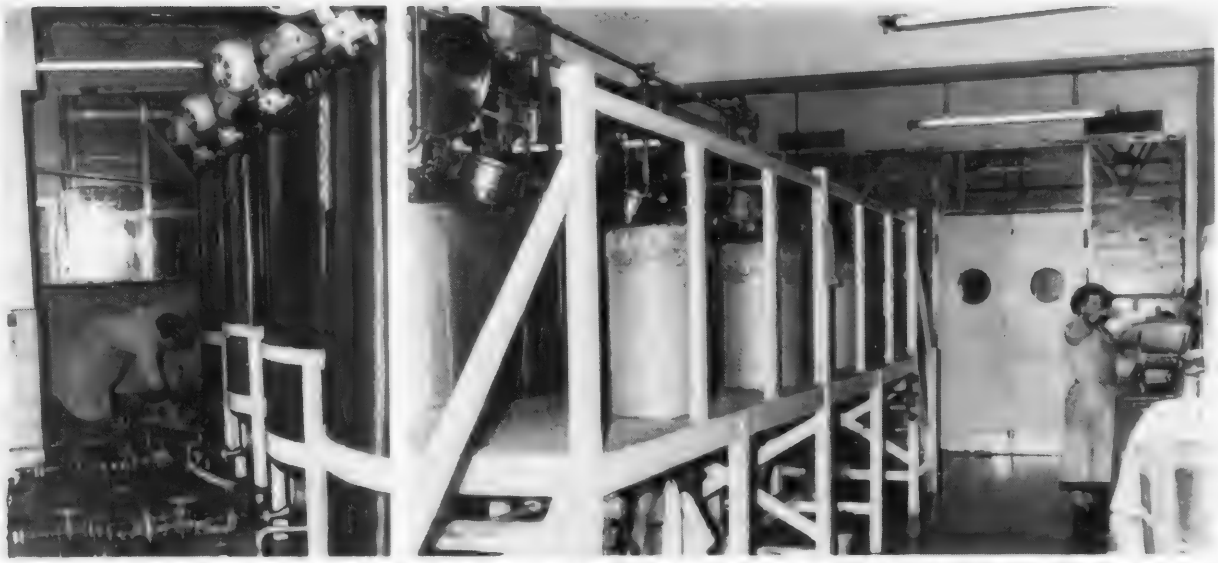
Comminuted whole orange drink is now one of the most popular soft drinks on the market. R. Fry and Co., Ltd., of Portslade, Sussex, who have been established 86 years, were one of the first to make the well-known "Sunfresh" brand. Here is an exclusive FOOD MANUFACTURE story on the manufacture and bottling of "Sunfresh."

IN 1874 a Mr. Robert Fry commenced the manufacture of aerated waters at premises with the curious address of 20½, Middle Street, Brighton. He quickly saw the possibilities that lay in the development of the syphon trade, and the firm say that he was the first in the south of England to introduce in commercial form the electro-silver-topped syphon, a trade which was carried out by a few chemists at that time. The aerated waters side of the business soon became firmly established, and in 1881 Mr. Fry was joined in partnership by Edwin A. Wallis, the father of the present chairman. The trade grew to such an extent that it became impossible to carry out all the business at Brighton, and so various branches were built or acquired at Eastbourne, Bexhill, Hastings, Tunbridge Wells, and Worthing, and an additional factory which had previously been the old Gaiety Theatre at Park Crescent Place, Brighton, was purchased and used as a warehouse. In 1929 the two Brighton factories became uneconomic to run and a new factory was built at Portslade; the business from the two old factories was transferred there on May 1, 1930. This factory is said to be one of the largest on the south coast for the production of soft drinks; it covers 3½ acres of floor space and employs about 150 people.

Since the war the company's activities have been extended to Guildford by the acquisition of Purnell and Co., Ltd., and recently to London by the acquisition of Melsom and Co., Ltd., of Notting Hill. Improved transport and new methods of bottling have enabled Fryco's to streamline their organisation by closing down several depots and branches, and their establishments at the present time are at Portslade (the headquarters), Hastings (depot), Guildford (factory), and Notting Hill, London. Total employees number about 300. A subsidiary company of Fryco's is Ingram and Royle, Ltd., who are the sole importers in this country of French natural spring waters, such as Vichy Celestins. This company became a subsidiary in 1895.

The company's products

Fryco manufacture every kind of soft drink as well as essences, food colours, and flavours, and are also licensees of a recently introduced product known as *Kinnie*. This drink originated in Malta and was discovered several years ago by the present joint managing director, Mr. W. H. Chatterton, during an overseas sales tour. It is popular on the Continent and is made from the essence of Chinese bitter oranges grown in Italy.



The air-conditioned syrup room where ingredients are weighed and added to "Sunfresh" in the 570 gal. stainless steel pans shown. Some of the glass pipelines in use throughout the factory can be seen, in the left-hand picture.

The firm became the first licensees of *Sunfresh* in England in 1953; we were told that they were the first in the field in England with comminuted whole orange drinks, the popularity of which is still rising. These drinks are made from whole fresh fruit without added juice, and have contributed much to the transformation of trade from a purely seasonal one to all-the-year-round activity. During our visit, which was made when demand was seasonally rather quiet, practically all production was concentrated on *Sunfresh*.

To cater for the increased demand during the summer, the firm's policy is to start building up stocks about the end of February, and to increase the labour force by about 30% in April. Although shifts are not normally worked, a shift system is operated during peak periods.

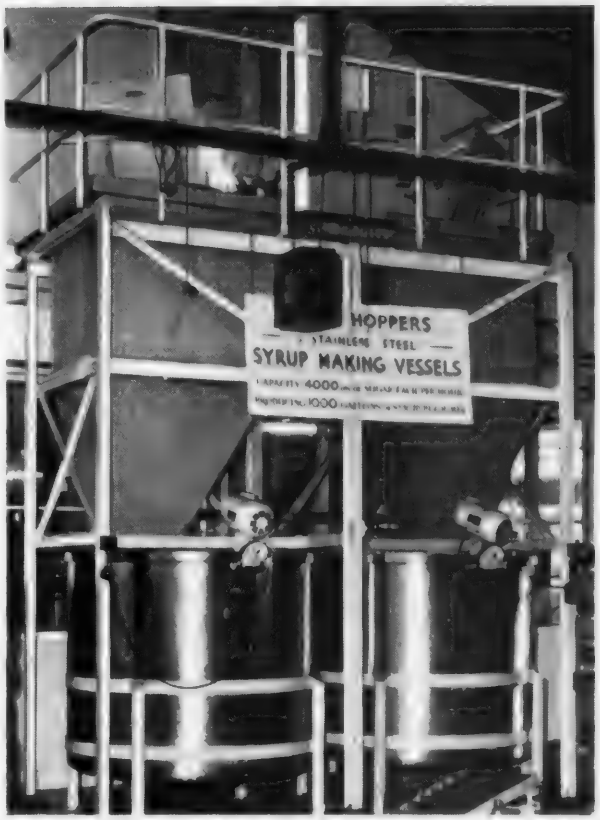
Oranges being unwrapped and decalixed, as they pass in front of the workers along a moving belt. The fruit is then weighed into wire baskets, a stack of which is seen in the foreground.

"SUNFRESH"

This orange drink is made from the whole fresh fruit imported from South Africa or from Spain, according to the season; we were told that the two types of orange are nearest to one another in flavour and the changeover causes no problems. Hitherto, oranges have been imported through the usual market channels, but the firm are experimenting with direct importation of fruit from Spain in railway wagons; instead of the fruit taking about three weeks or more from grower to factory, it takes by this means only five days. Obvious advantages are that the fruit arrives in perfect condition and wastage is considerably reduced.

Preparation of oranges

All stocks of fruit are stacked on pallets before being used, either in the usual market boxes or on open trays if the fruit has arrived by rail



(*Right*) **Operating the Montague Sharpe preset gauge which delivers a predetermined volume of boiling water to the syrup pans. Part of the heat exchanger for filtered syrup is seen lower right.** (*Left*) **The syrup making pans and the sugar hoppers by which sugar is gravity fed into the pans at the rate of 4,000 lb. hr., producing 1,000 gal. of syrup per hr.**

wagon. They are unwrapped and decalixed by women who work on each side of a conveyor belt along which the oranges pass. At the end of the conveyor, the oranges are held back by a gate; when a sufficient number have collected, an operator opens the gate and the oranges fall into a wire basket on a weighing machine. When the correct weight of oranges has been weighed into the wire basket, it is removed along a conveyor and replaced by another basket; the full baskets are placed on a pallet and taken by hand truck to presoaking tanks, where they are submerged in water at near boiling temperature to clean the fruit and to open the pores of the peel so as to make easier the extraction of oil during the subsequent processing.

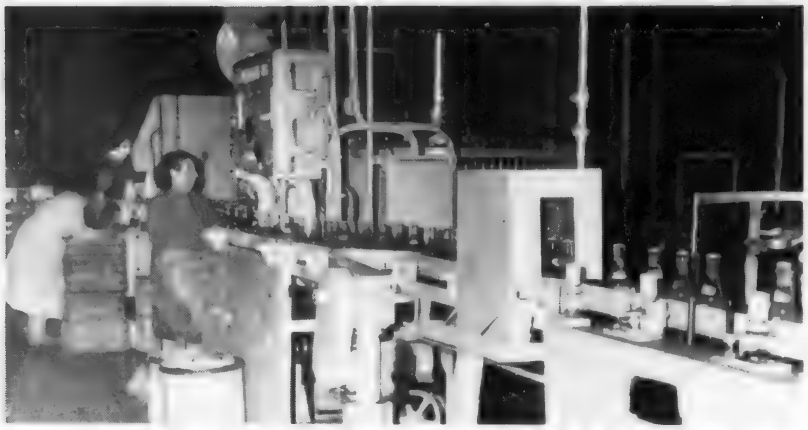
Preparation of sugar syrup

Sugar is obtained from Tate and Lyle, Ltd., in 1-cwt. paper bags and stored on pallets holding 15 cwt. apiece. Two Potterton gas boilers produce boiling water at the rate of 1,000 gal. per hr.; this is stored in a 1,200 gal. tank. By means of a Montague Sharpe preset gauge, a predetermined amount of boiling water can be sent down to either of two 400 gal. stainless steel tanks fitted with electric stirrers. Above each tank is a hopper which is loaded with the correct weight of sugar and the sugar is fed by gravity directly into the pan. The resulting syrup is filtered and passed through a heat exchanger before use.

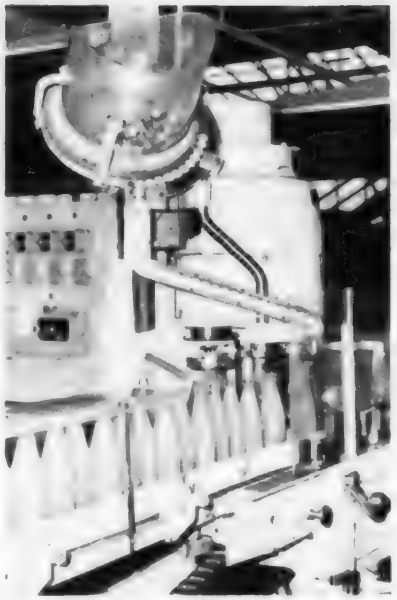
Monopumps pump the syrup to any pan as required. Each type of squash requires its own strength of syrup, and syrup is made in the two pans in the manner described, whether it be required for *Sunfresh* or for any of the other products. All process pipelines in the factory are of Pyrex glass, which allows a visual check to be made of their cleanliness. Process water for the entire factory is filtered through a Metafilter before use.

Manufacture of "Sunfresh"

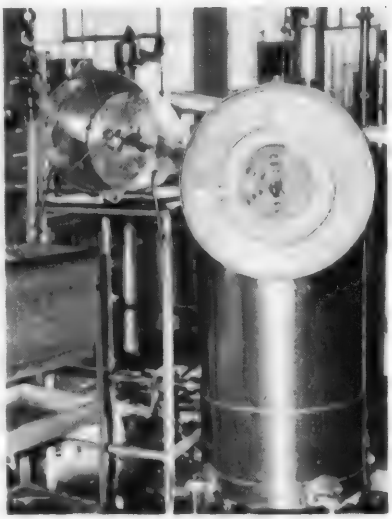
Sunfresh is made in a bank of convertors; each consists of a stainless steel tank, which is filled with warm syrup. Within the tank and fitted to the head is a cylindrical sieve. The contents of two baskets of oranges are fed by hand through a chute fixed to the convertor head; they drop on to a slotted horizontal wheel rotating at high speed. Eighteen knives fixed to the wheel cut the fruit into slices which drop through the slots into the perforated sieve, which is immersed in the warm syrup. Within the sieve on the same axle as the rotating wheel are impellor blades which stir the pulp and ensure thorough mixing and extraction of the vital constituents. The whole process is controlled by a time switch on each convertor which is set before the operation commences. At the end of the process, the head is removed, the drum filled with fruit pulp is taken out of the syrup and drained for a



A general view of the Clayton filling line showing on the left the 8 head doser, in the centre the carbonating and capping machine, and on the right the spray rinser.



The Metal Closures, Ltd., capping machine which is capping 26 oz. bottles of "Sunfresh."



The component parts of a convertor, showing the underside of the head with the slotted wheel cutter which rotates at high speed. On the left is the perforated cylindrical screen which fits inside the container and retains the solid fruit pulp.

few minutes to allow the retained liquor to be recovered from the pulp. There is no commercial outlet for the pulp, and it is disposed as waste.

Air conditioned syrup room

The *Sunfresh* from the convertors is pumped by a Megator pump to the syrup room for further processing to the final drink. This room is air conditioned, important where hygiene and uniformity of product are concerned, and no unauthorised person is allowed in. At present it contains four 570-gal. stainless steel containers in which the *Sunfresh* is made, but this capacity is being enlarged and the firm hope to have the extensions working by Easter. After being pumped, the liquor has added to it colour, citric acid, more syrup and preservative. The natural colour of the liquor is a pale yellow, not associated in the consumer's mind with orange, and so to make the drink's appearance attractive, colour is added. Citric acid, too, is necessary to develop the flavour; although natural citric acid is present in the fruit, there is insufficient natural acid in the final product for a satisfactory flavour. Finally, water is added to bring the batch to the required volume.

Laboratory testing

Before batches are filled out for sale, they are tested in the laboratory for correct ingredient content and freedom from bacteria. The latter is an important requisite, and the bacteriological laboratory is well equipped with an incubator and other necessary items to check that the utmost freedom from contamination has been achieved. The use of glass piping, previously mentioned, plays an important part in ensuring this; it is easier to keep sterile than other types of piping, does not corrode, and its internal condition can be seen. The path of a process line can be seen at a glance, and the end of a pumping or filling operation is at once apparent. All these advantages make for increased efficiency and minimise the risk of mistakes.

FILLING AND BOTTLING

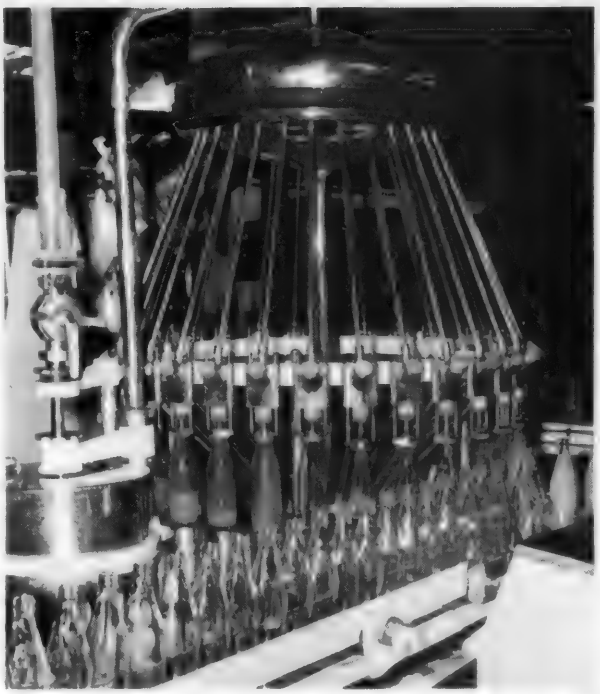
All *Sunfresh* and other products are bottled on the premises. There are four filling lines, employing a variety of machinery for the bottling of both carbonated and still drinks. To facilitate the carbonation of squashes, there is a refrigerated water storage plant with a capacity of 1,000 gal. per hr. Each filling line is independently operated and used according to requirements. During our visit, three of the lines were in use, two filling still *Sunfresh* into 26-oz. bottles and one filling carbonated *Sunfresh* into 6½-oz. splits.

Vactor filling line

This takes its name from the *Vactor* filling machine. It has a capacity of 300 doz. bottles per hr. Empty bottles are fed to a Dawson 8-cup washing machine with semi-automatic feed, and move by automatic conveyor to the rotary filling machine which operates by suction. The filled bottles pass to an R.O. sealing machine for capping and then to a Banks labeller.

Albro filling line

This has an output of 600 doz. bottles per hr. and is entirely automatic. When working at maximum capacity, it uses four lorry and trailer loads of new bottles per



(*Left*) "Sunfresh" being filled into 26 oz. bottles by an Albro rotary vacuum filler. (*Right*) 6½ oz. splits of carbonated "Sunfresh" being crated.

day. The start of the line is a Dawson 12-cup fully automatic bottle washing machine. From there the bottles pass to an *Albro* filler, thence to a capping machine made by Metal Closures, Ltd., which automatically rolls on and tightens the screw caps. Next in the line are two Purdy labelling machines.

Clayton filling line

This was being used to fill 6½-oz. splits with carbonated beverage. The splits have fired-on vitreous labels which are an integral part of the bottle, thus eliminating the need for labelling. To wash the bottles a Rylands washing machine is used; the washed bottles pass to an automatic 8-head doser which injects a measured dose of beverage into each bottle, then to a filler which tops up each bottle with carbonated water under pressure. The filling machine was operating so smoothly that the layer of beverage syrup in the bottom of the bottle was hardly disturbed by the injection of the carbonated water. For heavy syrups this may be a disadvantage, and an automatic mixing machine in the line can be used when necessary. This machine consists of a rotating table round whose periphery are a number of claw clamps; as the bottles after crowning are directed to the machine by the moving conveyor, each bottle is grasped by a clamp and turned on its side several times as it moves round.

After carbonation the bottles pass to an 8-head crowner and then through a rinser where they are sprayed with water to remove traces of beverage on the outsides. This filling line can handle any size of bottle from 4 to 26 oz., and has an output of about 500 doz. bottles per hr. Finally, the bottles pass through an illuminated visual inspection point where an operative examines every bottle as it passes against a white background; dirty or faulty bottles are rejected.

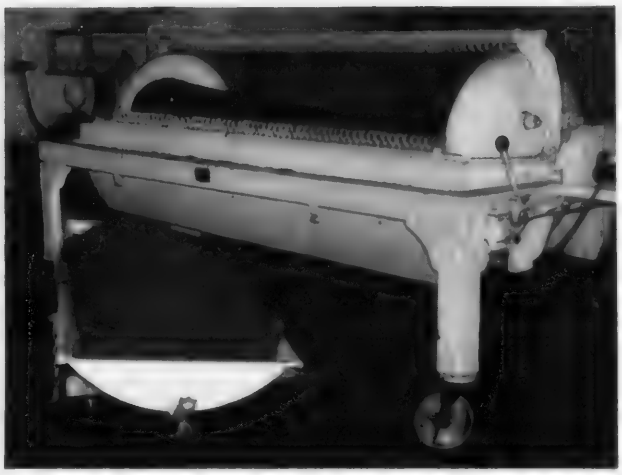
K.S.U. filling line

This consists of a K.S.U. filling unit for dealing with pint and 26-oz. carbonated bottles. There is also a Dawson machine for washing screw stoppers, and an automatic machine for putting the rubber washers on the stoppers, an operation which was formerly done very laboriously by hand. This machine has a revolving feed table on which stoppers and washers are placed side by side; the stoppers with washers in place emerge from the machine on the same table and drop into a receptacle.

Automatic recording of production and breakdowns

As the filled bottles pass along each filling line, they are counted by an automatic device known as a *centrilograph*, which transmits information to a recording receiver in the managing director's office. In this office there is also a recording instrument which produces on a continuous strip chart an inked record of the operation of all four production lines. A continuous line against a time base shows the periods of filling operations; gaps correspondingly indicate periods of inactivity. Breakdowns and the reasons for them are indicated on this chart in the following way. Each type of breakdown (failure of filling machine, failure of labeller, etc.) is designated by a code number; near each filling line is a dial similar to the dial on a telephone; when a breakdown occurs,

(*Continued on page* 120)



The Willmes Press for grape pulp, showing (*left*) the internal arrangement with loose pulp, and (*right*) the rubber bag which is inflated with compressed air for exerting pressure.

Pure Fruit Juices

Processes, Machinery and Research Reviewed

By V. L. S. Charley,* Ph. D.

Increasing recognition of fruit juices as a valuable source of vitamins has led to intensive research work on both natural and concentrated juices and improvement of methods of production. Uncommon varieties of fruit are becoming locally important as is shown in this article, which outlines the present situation in this vital industry.

MANY of the recent developments connected with pure fruit juice production had their inception in the years 1939-46, when war conditions called for new techniques in the processing of every type of foodstuff. The war certainly did more to make the public of the British Isles conscious of the existence and value of fruit juices than any other single factor. The Ministry of Food's ubiquitous Food Facts columns invariably contained references to the need for a regular intake of vitamin C, and indicated ways in which this intake could be regularly accomplished. The blackcurrant, rose hip, and orange syrups sponsored by the Ministries of Food and Health were distributed throughout the whole country, and wherever the products were given to children the occupants of the home became conscious of the fact that here was something that the Government thought necessary for the health of their children. The Ministry of Food orange juice product is still widely distributed throughout the country, and rose hip and blackcurrant materials, all with guaranteed vitamin contents, are readily available for children who either prefer these syrups or who come outside the age range for the official distribution.

Another welcome feature has been the increase in the distribution of tomato, orange, grapefruit, and pineapple juices. Many of these are becoming increasingly popular amongst women, who are grateful for the opportunity to consume high-class products of this type instead of alcoholic cocktails. Pure fruit juices, especially from oranges and grapefruit, have been introduced since the war in cans, and very attractive products are now available to all classes of the community.

* Technical Director, H. W. Carter and Co., Beecham Foods, Ltd., Coleford, Glos.

Developments overseas

There have been amazing developments in pure fruit juices in the United States, where hundreds of millions of gallons of orange, pineapple, and tomato juices have been distributed as straight products or as frozen concentrates. On the Continent there has been a return to the pre-war type of pure apple and grape juices which was such a remarkable feature of the German and Swiss beverage industries, but as well as this has been the development of a variety of special products containing varying proportions of fruit juices.

A very significant sign of the growing-up of the industry was the Fourth International Fruit Juice Conference in Stuttgart in 1956. In the first place, there were daily sessions of the Scientific and Technical Commission associated with the International Federation of Fruit Juice Producers. Famous scientists such as Profs. Deuel, of the Zurich Tech-

nical High School, and Mehlitz and Koch from Berlin and Giesenheim respectively, were engaged in detailed discussions with the scientific staff of firms in the industry on the complicated interrelationships of pectic substances in fruit juices and the precise effects of various enzyme materials on the naturally occurring pectic materials in fruits. Firms producing pectin-degrading enzymes sent their research chemists, who produced a wealth of scientific information indicating, as far as possible, the precise mode of action of their specific enzyme. Until the last year or two the potency of pectin-degrading enzymes had been assessed by various physical methods, prominent amongst which was the reduction in viscosity of some form of pectin solution. More recently attention has been paid to the actual changes in the size and nature of the pectin molecule following enzyme action, and it is apparent that various enzymes have widely differing methods of attacking pectic materials.

The general sessions of the Conference included not only technical matters, but symposia on quality considerations, tasting panels, economics, detailed costings, and the nutritive and medicinal value of fruit juices. As a very good example of the "new look" in fruit juice developments, it is intriguing to consider in a little detail the work which was reported at Stuttgart concerning the effect of the quality and condition of the raw material on fruit juices. Never before has this subject been dealt with in such detail or with such good effect. The complicated problems of apple quality were discussed primarily by director Baumann, the doyen of European fruit juice technologists; Dr. Favennec discussed in detail the French views on this subject, and, coming as he did as technical director of one of the largest French fruit juice and cider factories, his assessment of the quality relationships of French apple material was presented with considerable authority and value. The British Isles is noted for its tremendous range of varieties of apples, and Dr. Pollard, from Long Ashton, put into clear perspective the actual quality story as it is affected by these varying types of fruit.

On the other hand, Dr. Sulc discussed the influence of the condition of wild pomegranates from Yugoslavia on their use for juice, tannin, and pectin production. How strange it was to see the results of a very detailed examination of the effect of the quality of tomatoes on the final bottled juices reported by Monsieur Thomas, a director of a large fruit juice organisation in, of all places, Nuit St. Georges—how the famous grapes must disdain all this attention to the humble love-apple! Studies on the quality of fruit raw materials from Bosnia and Herzegovina and emanating from Sarajevo made one wonder whether the next paper would be coming from Anthony Hope's Ruritania and providing a list of fruits and their compositions ascertained by a fellow-countryman of Rupert of Hentzau.

Local importance of uncommon fruits

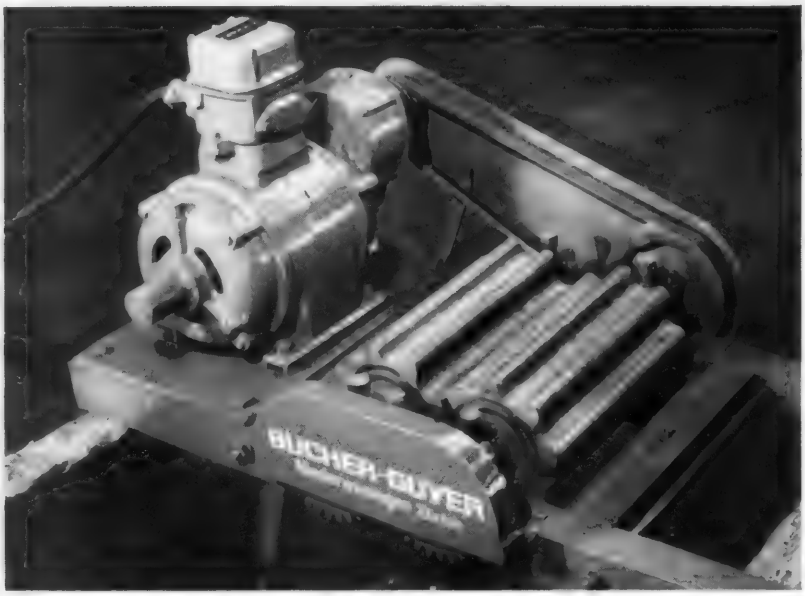
Other fruit juices besides the common market variety are nowadays used as sources of juice with high vitamin contents. Much information is available on wild and forest berries (this was discussed by experts from Munich and Helsinki), and many varieties of fruit which are not grown in hundreds of thousands of tons have nevertheless great local importance. For example, the fruit of the sea buckthorn (*Hippophaë rhamnoides*) is being collected from many sources in Europe and processed in Munich into a fruit syrup with a high vitamin content and with an extraordinarily rich and "variegated" flavour. This fruit was used in the war to provide natural vitamin C in the diet of U-boat crews. In some of the islands in the Caribbean area the acerola fruit (West Indian cherry) has been shown to contain up to 4,000 mg./100 g. of vitamin C. This fruit has been converted by local firms with American affiliations into a stable fruit juice base retaining a large amount of vitamin C, and this base has been on sale in America itself blended with pure apple juice as a natural source of vitamin C particularly suitable for young children.

In completing its world-wide consideration of the influence of fruit quality, the conference moved away from Europe and heard contributions from Dr. MacDowell, of the Florida Citrus Research Station, Dr. Royo Iranzo, one of the chief Spanish Government fruit product consultants, and Dr. Kefford, from the Homebush Research Station in Australia, all of whom took up in person or sent contributions concerning the effects of citrus raw material on the finished products.

These papers all had one common basic theme—to produce sound, clean, nutritious pure fruit juices attention must be paid to the growth, flavour, chemical composition, vitamin content, and transport stability of the raw material.

PROCESSING IMPROVEMENTS

During the past five years, no outstanding improvement has been made in any particular process. For apples and pears the search for a continuous press avoiding the use of racks and cloths has still been unsuccessful. A double-drum dejuicer has been investigated in America and a patent applied for the machine through the United States Department of Agriculture, but enquiries made very recently do not suggest that it has yet been used on any commercial scale. On the Continent, processors have contented themselves by introducing streamlined presses with single, twin, or triple stations, such as the Bucher-Guyer triple pack press illustrated. Some of these presses have been fitted with a timing device on the revolving drum which measures the pomace into the cloths. This device can be used to speed up the operation of the press, but the workmen must have completed their introduction of a fresh cloth and rack by the time the pomace drum discharges its next quota. It is understood that



Grape crusher, for use with rotating grape press, made by Bucher-Guyer, Switzerland.

this provision is not really favoured by the workmen, and is not likely to be a continuing feature of this type of plant.

Grape presses

The enormous importance of the operation of pressing grapes in Europe is responsible for various new types of presses devised solely for this fruit. The Willmes machine (illustrated), in which pressure is obtained inside a large circular perforated cylinder by inflating a cylindrical rubber bag, has apparently captured the imagination and interest of grape juice and wine producers in Europe and, to a lesser extent, in other grape-growing areas of the world, South Africa in particular. This press, however, is very difficult to operate with other fruits. The Bucher-Guyer grape press introduces the concept of a rotating perforated drum which enables the free-flowing juice to be removed from the pulped grapes before heavier pressure is applied. The Bucher-Guyer machine is used in association with this firm's special roller mill, which does not provide a mash of purée consistency, but merely crushes the grapes into a crude pulp. By so doing, the pieces of skin are left of such a size that they do not pass through the perforations of the periphery of the press and act as a filter to remove the very finely divided tissue from the grapes. Unfortunately, presses of this particular type do not appear to be suitable for use with apples or pears because of the inability of milling such fruits into any form of coarse pulp. It is unfortunate that this is so, for these presses offer undoubted advantages to the processor over the traditional cider type press with all the latter's obvious lack of sterility associated with the large number of cloths and racks which are needed in any sizeable installation. Neither are these so-called continuous presses really continuous in operation; their advantage for grapes resides in the fact that they can be built to hold large weights of pulp and cloths can be entirely dispensed with.

Centrifuges

Various centrifugal devices to remove juice from a fruit pulp have been discussed and examined in the past year or two. In some cases a cloudy juice retaining a considerable quantity of finely divided tissue can be separated in a continuous fashion. However, problems of excessive aeration and low yields of juice make such procedures unacceptable as sole means of obtaining economic production of juice from fruit, but it may well be that some such system may be developed which would provide a reasonable amount of fruit juice and leave the rest of the liquid phase to be removed from the pulp coming from the centrifugal machine by means of a traditional press rack system. The difficulty with machines of this type is that manufacturers often imagine that a machine which will deal adequately with another type of raw material, perhaps granular or even crystalline in nature, will work equally well on biological material. One such instance comes to mind, where a machine of very high and deserved repute in another industry was suggested for the removal of juice from a fruit pulp. The manufacturers were completely confident that the machine would be successful for the proposed duty. However, the first test before an imposing group of the firm's technicians gave an encouraging "swish" of juice, but only for a very few seconds, after which the juice refused even to ooze through the outer cylinder. These experiences suggest that the physical chemistry of milled fruit tissues might well be subjected to an intensive study. In the past, improvements in press efficiencies were based on the feeling that to recover more juice one merely had to apply heavier and yet heavier pressures. This attitude is now out-moded, but we are still in the dark regarding the precise factors concerned with the efficiency of the removal of juice from various fruit materials.

Citrus fruit

As far as citrus fruit is concerned, the main developments have been concerned with increasing the speed of operation of the juice extractors, improving the cleanliness of the machines and their capability of being quickly and conveniently sterilised, and with the extraction of juice entirely free from oil from the skins. Such machines represent a very high degree of technical efficiency, have enormous outputs, and are fundamentally based on knowledge of the site of the oils and other specific flavouring materials in the citrus fruits.

Increase in production in very recent years has made it necessary to produce concentrated rather than straight juices for storage wherever possible. In view of the over-riding importance of high quality flavours in the final juice products, concentration methods have been continually under review, and large, stainless steel, high-vacuum evaporators are now regularly employed in European fruit juice factories. There are a variety of these machines in use for fruit juices. In some cases, such as the Mojonnier, and (more recently) the Kestner, evaporation can be carried out practically at room temperature by introducing a special refrigerant into the condensing system. Some evaporators, such as the Luva, specialise in an extremely short time of contact between the juice and the heating surfaces. Within the last two years the A.P.V. evaporator has gained favour where it has been used on citrus juices in the British West Indies, on apple juice in this country and on apple and other juices in Switzerland.

Attention is still being paid to the development of improved methods for the recovery of the "top notes" of flavour, and the literature in the past three years has contained many references to systems which all appear to owe something in their basic design to American work, which showed that there was an advantage in taking off the volatile constituents at atmospheric pressure rather than in a vacuum. Storing some of a firm's raw material stock in concentrated form seems likely to be influenced by recent developments in this sphere of fruit juice production.

RESEARCH WORK

Frozen concentrates

Examples of recent research work in the pure fruit juice industry are the investigations on the stability of flavour and cloud in frozen concentrated orange juice. This product appears to be the most important individual fruit juice product in the world, and many research organisations in the past five years have investigated in every way problems which have arisen in developing such a fantastic scale of production. Prominent amongst these investigations have been a series from the Florida Citrus Experiment Station at Lake Alfred. A. H. Rouse[1] carried out a thorough investigation into the distribution of pectin esterase and total pectin in the component parts of citrus fruits. He found that the highest activity was associated with the juice sacs and the lowest with the juice itself. This finding was true for four varieties of oranges, two of grapefruit, and one of mandarin. When the order of the component parts for pectin esterase activity, per g. of dry solids, for tangerines and oranges, was set out in decreasing order of magnitude, it was found to be as follows: juice sacs, rag, flavedo, albedo, seeds, and juice; but in grapefruit the flavedo and albedo exhibited the highest activity. Similar differences in the composition of the pectin materials in the various parts of the fruit were found to exist between the oranges and the grapefruit, and this variation suggests that no standardised form of processing is possible for all citrus fruits.

Gelation and clarification

Rouse was one of the first to observe that as the pulp level of citrus juices is increased by the incorporation in the juice of more rag or juice sacs, the pectin content is increased and the juices show higher pectin esterase activities. Hence, the level of pulp in the juice will greatly affect the degree of gelation and clarification of the juices on storage.

Atkins *et al.*[2] examined in detail the effect of heat treatment of orange and grapefruit juices, prior to concentration, on gelation and clarification in the concentrates. The effectiveness of the heat treatment was found to be dependent upon the temperature employed and the quantity of pulp present in the juice. Traces of pectin esterase remaining active in the heated juices were capable in many cases of causing marked gelation and clarification in the concentrates when stored at 40°F.

Storage stability

Apart from the enzyme systems involved, the Florida Citrus Experiment Station staff have examined the effects of the concentration of pectin on stability. Rouse *et al.*[3] found that a 42° Brix orange concentrate containing 50 mg. of pectin per 100 g. of serum retained a satisfactory cloud for 50 days when stored at 40°F. On the other hand, stability was only maintained for ten days in a concentrate with 29 mg. of pectin per 100 g. of serum. In each of the two experimental samples the pectin esterase activity was of a similar order. Samples with high or low quantities of pectin, but with pectin esterase activities four times as high as those in the previous tests, retained satisfactory clouds for only 3·5 and 1·5 days respectively.

It is suggested that when pectin esterase potencies are similar, orange concentrate has a length of satisfactory storage life related directly to its pectin content. When the pectin contents are identical, the storage life will be inversely proportional to the enzyme activity.

Work on blackcurrants

Kieser, Pollard, and Sissons,[4] writing in the Long Ashton Annual Report for 1957, carried the pectin methyl esterase story into the blackcurrant field. They confirmed the general findings of the Florida workers, but introduced the interesting and significant consideration of the effect of the phenolic components of the fruit on the effect of the naturally occurring pectic enzyme systems. The authors indicate from their own unpublished work that a yeast polygalacturonase, inactive against fully methylated pectin, readily breaks down the pectin in blackcurrant pulp when the naturally occurring pectin methyl esterase is also present.

Inactivation of the natural fruit enzymes by heat may limit the effectiveness of added enzymes and explain some of the difficulties

(*Left*) **A triple pack Bucher-Guyer hydraulic press for apples and pears.** (*Right*) **Two Bucher-Guyer rotating grape presses of the latest type with daily capacity of 200 tons.**

experienced in degrading the pectin of canned blackcurrent pulp referred to by Reid.[5]

FLAVOUR ASSESSMENT

Some of the biggest advances in fruit juice techniques in the last five years have been associated with the assessment and identification of fruit flavours. This was noted at the Stuttgart Conference, where elaborate tasting panels were set up early in the morning before the Conference commenced, and in some of which 300 people tackled the assessment of flavour of various juices to arrive at the most satisfactory way of grading the products for marketing purposes.

A flavour assessment of a fruit juice product can now involve a specially designed room with suitable individual bays for the tasters, variable lighting effects, and the inevitable statistician, who generally makes a contribution to all phases of the whole tasting operation except actually tasting the product himself.

Identification of flavour constituents

Apart from the type of information which is given by such panels, the actual composition of flavour is being investigated by the very latest scientific tools available for the separation and isolation of organic compounds. The fugitive nature of the flavour of many fruits makes such an investigation extremely difficult. It has been reported that the flavour of a choice, ripe strawberry begins to deteriorate within minutes of the fruit being picked, and although such a deterioration may not be readily discernible by the ordinary members of the public, the changes involved, minute though they are, have an ultimate significance which is now being more fully appreciated.

In May, 1957, the Advisory Board on Quartermaster Research and Development of the United States Army published a report on "The Chemistry of Natural Food Flavours," a 200-page book based on a symposium originated by the Committee on Foods. The report deals with many types of foods, but specific attention is given to the question of citrus juices, and gas chromatography and mass spectrometry are used for the separation and identification of natural or "off" fruit flavours. As an indication of the intensity of thought that is being applied to this subject, an apparently serious suggestion was made by one of the contributors to the symposium that dogs, or even lower forms of animal life, might well be trained for the detection and separation of flavours which are too fugitive or minute in quantity for other methods of inspection. Presumably if this sort of thing develops, the technique of "Brave New World" will be called on to produce new species capable of providing ever-increasing susceptibility to smells!

Work has continued on assessing the actual constituents of the aromatic fractions of various fruits. In some cases exceptionally large quantities of juice have been either solvent-extracted or concentrated with volatile recovery to provide reasonably large amounts of the volatile materials, which have then been subjected to chemical separation and identification.

Off-flavours

Flavour assessment has a particular interest when it is concerned with off-flavours. The frozen citrus products now being distributed in America sometimes suffer a deterioration of flavour which, in the last few years, has been given the general title of "C.O.F. effect" (cardboard off-flavour). The adjectives which have been used in U.S.A. to describe the sensory perception of this effect are "cardboard," "tallow," and "castor oil," although a whole range of other adjectives has been applied to the effect by various workers. The flavour is sometimes present in orange or grapefruit frozen concentrates, but only appears after a period of frozen storage varying from a few days to several weeks. In many cases prolonged storage tends to reduce the effect. The disappearance is slower at 0°F. than at higher temperatures. There is an extreme package-to-package variation which makes investigation of the cause of the effect extremely difficult. Strong evidence exists that C.O.F. is correlated with some physiological immaturity in the fruit. The

"tallow" character can be reproduced quite effectively by dispersing in normal citrus juices the higher fatty acids obtained by saponifying grapefruit seed oil which has been de-bittered. The work which has been done on this subject suggests that there may be a connection between the off-flavour and changes in the lipids in the juice. A very considerable literature already exists on this subject, and the information from workers published prior to 1957 has been effectively marshalled by J. S. Blair *et al.*[6]

PRESERVATIVES

The use of preservatives in fruit juices is likely to be justified for some time to come, even to a purist, in order to retain both natural flavouring and nutritional characteristics at their highest possible level. Sulphur dioxide has the double disadvantage of a noticeable taste (in many juices) and instability in the product. Benzoic acid is more difficult to handle and to get into the product, and in many cases it is not such a good general preservative as SO_2, but, except to a few people, its taste is not noticeable. The well-known and often acceptable reducing effects of SO_2 are not shared by the other preservative.

Sorbic acid

It seems that sorbic acid used in the form of its sodium salt has certain advantages over both the other preservatives. There are apparently no toxic effects, and there is no marked taste reaction. It is impossible to predict the attitude of the Ministry of Food Preservatives Committee to the use of sorbic acid in foodstuffs, including fruit juices, in this country. It is, however, as well to have in mind some ideas as to what sorbic acid can do in fruit juice preservation. Weaver *et al.*[7] showed that 0·1% of sodium sorbate extended the storage life of freshly pressed apple juice from one day to seven days at 70°F. and from one week to several months at 40°F. The material inhibited yeasts and moulds, but did not control bacteria. On a weight-for-weight basis sodium sorbate was more effective in preserving fresh apple juice than sodium benzoate, and no detectable off-flavour could be found when it was used in concentrations of 0·1% or less. Ferguson and Powrie[8] have reported that 0·035% of sorbic acid has preserved the fresh flavour of apple juice stored at 77°F. for periods up to ten days, whereas a combination of sorbic and ascorbic acids increased the period up to two weeks.

It seems that sorbic acid might well prove to be a valuable addition to the very restricted list of preservatives available to fruit juice producers at the present time. Until improvements in knowledge and technique in other branches of juice storage and stabilisation are made and can be used satisfactorily to avoid the use of preservatives, these additives must be accepted as having a real value, and sorbic acid seems to have several useful advantages over the others.

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Test for Enzyme Activity after Blanching

A NEW time-saving device for testing enzyme activity after blanching that is claimed to be accurate and helpful in maintaining quality control in vegetable freezing plants has recently been developed by the United States Department of Agriculture.

It consists of a filter paper that has been treated with the chemicals *ortho*-tolidine and urea peroxide. A blanched pea, or a piece of cauliflower, broccoli, asparagus, or other vegetable pressed against the treated paper will cause coloration of the paper if enzyme activity exists and the extent of the inactivation of the enzyme peroxidase will be revealed within a few minutes. The time it takes, within very narrow limits, for the paper to change colour is a clue to the efficiency of the blanching process. If the colour does not change within a minute or a little longer a correct amount of blanching is indicated. With a little experience it is claimed that quality control can be effectively tested with various products under various conditions.

The filter papers used in the test can be easily prepared. Ordinary filter-paper discs are soaked for 30 to 60 sec. in an alcohol solution containing the *ortho*-tolidine and urea peroxide, following which the saturated test papers are removed from the chemical bath and pressed in a clamp to remove surplus liquid. The moist papers, previously punched with a $\frac{3}{8}$ in. hole near the periphery, are then hung on a line for 30 min. to dry, following which they are stored at low temperature until needed.

For testing, freshly cut blanched vegetable is pressed against the paper and timed until a blue colour appears. Using different parts of the vegetable this will show the portions where the peroxidase has been inactivated and will give the variations in peroxidase activity of different areas of the vegetable. This use is claimed to be especially unique in measuring enzyme activity without destroying the sample. If the average peroxidase activity of a sample is required, the method recommended is to make an extract of the food, place a drop or two on a filter paper with a pipette and wait for the colour change.

The new test paper has been developed by H. J. Morris, research chemist at the Western Utilisation Division of the U.S. Department of Agriculture, Albany, California.

SOFT DRINK PRODUCTION MACHINERY

Foodtech KS Universal cutting machine.

Here is a FOOD MANUFACTURE survey of the latest equipment available for fruit and juice processing and bottling.

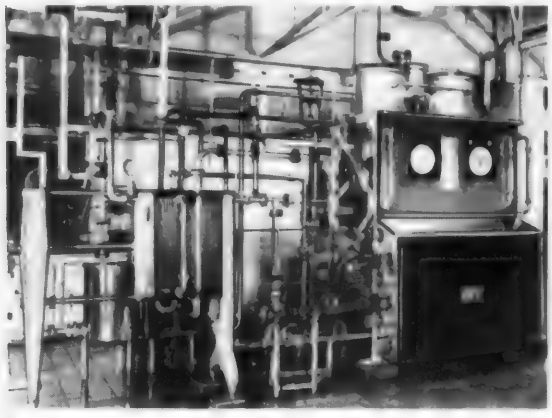
Comminuting whole fruit

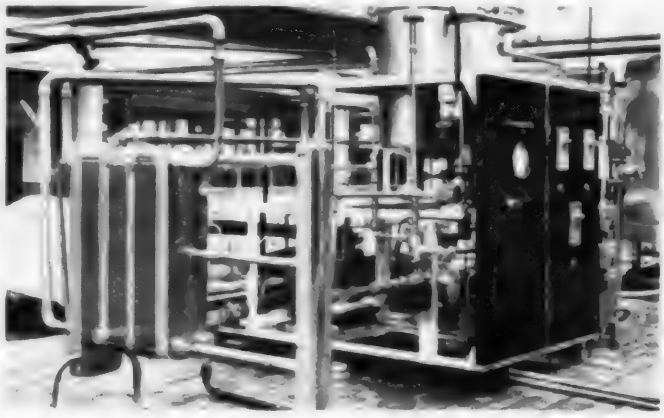
COMMINUTED fruit drinks are one of the latest developments in the field of soft drinks; Apex Construction, Ltd., manufacture a range of comminuting mills for the production of crushes from whole oranges, lemons, grapefruit, etc., and for producing fruit purées for soda fountain use and for sundaes. The machines are available in four sizes from 3 to 30 h.p. Product size can be controlled by changing the screen, speed or blade face; easy dismantling and cleaning make possible a rapid change from one kind of fruit to another. The output of the No. 114 type F model when comminuting oranges is approximately 3,000 lb./hr. This machine is fitted with a 6 in. power driven screw feed which is mounted on a movable top plate operated by a handwheel. The feed throat is fitted with a stainless steel control valve and comminution of fruit can be carried out simultaneously with addition of syrup. All parts in contact with product are of stainless steel and sterilisation of the chamber and feeder up to 165°C. is permissible. A larger model the 170, is available.

The *KS Universal* Cutting Machine supplied by Foodtech, Ltd., may be used for converting whole oranges and other fruit to very finely cut pieces; the degree of fineness may be varied and different outputs are obtained by fitting motors varying in power from 9 to 75 h.p. The machine can be supplied with either mild steel or stainless steel cutters and interior finish, and delivery time is 8 to 12 weeks.

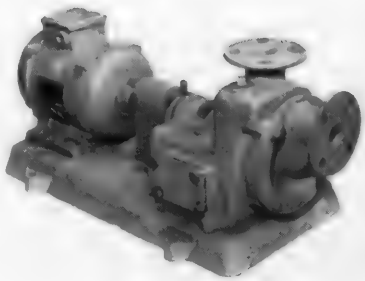
Pasteurising plant

The A.P.V. Co. say that their combined fruit juice de-aeration and pasteurisation plant, first introduced in 1946, is now in use in all the fruit

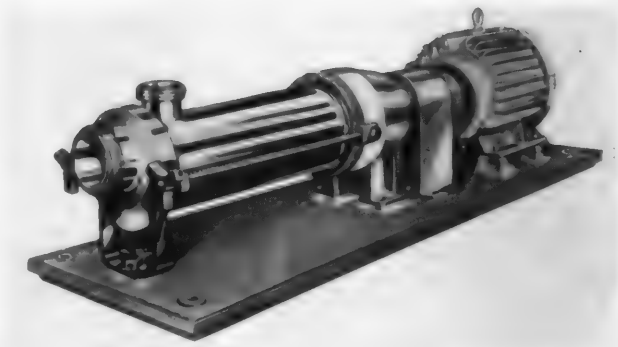




Fruit juice pasteurising and de-aerating plants. (*Left*) The A.P.V. standard plant has an output of up to 400 gal. per hr. which can be raised to 1,000 g.p.h. in modified versions. (*Right*) C.P. Equipment's plant which has an output of 1,000 g.p.h.

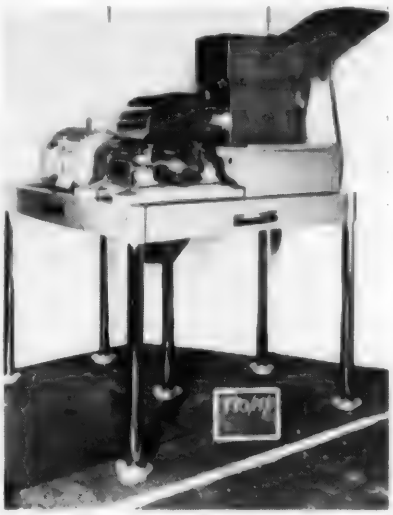


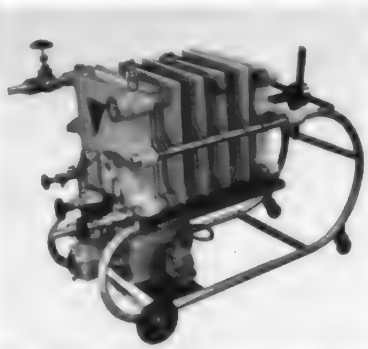
(*Left*): **The Girdlestone Autostart self-priming centrifugal pump will pass small solids in suspension and does not have any valves.** (*Right*): **The Mono Kwikleen Type K63 pump is designed for quick and easy cleaning.**



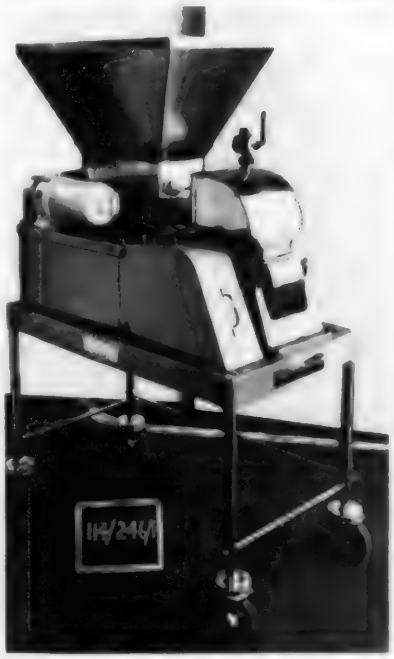
growing areas of the world. All metallic surfaces which come into contact with the product are of stainless steel. The plant is designed to de-aerate and pasteurise natural strength juice, and the outgoing juice can leave the machine either as hot juice, with or without partial cooling, for filling into cans without preservative or for concentration, or as cooled juice for filling into bottles or tanks with preservative. In the latter case, 60% of the pasteurising heat can be recovered by interchange. The standard plant has a maximum capacity of 400 g.p.h. Modified versions are available with outputs ranging from 130 to 1,000 g.p.h. When pasteurisation only is required, the de-aerator can be by-passed.

The continuous de-aerating and pasteurising plant made by C.P. Equipment, Ltd., has a capacity of up to 1,000 g.p.h. Fruit juice screened to 3 mm. enters the plant at a steady rate from a float-controlled balance tank. The juice is drawn into the de-aerating chamber by vacuum maintained by a pump protected by a foam trap. The juice cascades to the bottom over a series of perforated baffle plates arranged to give the necessary turbulence and to expose the maximum surface area for efficient de-aeration. The de-aerated juice is then fed to a plate heat exchanger, where it is heated to the pasteurising temperature, 198°F, and held at that temperature for 35 sec. in a glass holder tube. It is then cooled in the heat exchanger to 68°F. It is claimed that the plant will run for up to 16 hr. per day with satisfactory results.

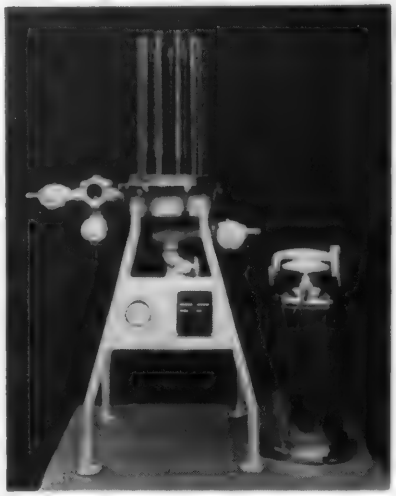




The Carlson Ariston Princess Filter Size VIII is fitted with a built-in pump and takes a variety of filter sheets.



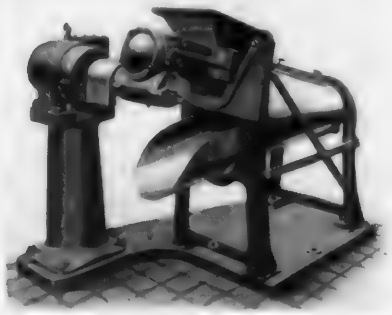
Apex comminuting mills. (*Above*): **The No. 170.** (*Below*): **The No. 114, type F.**



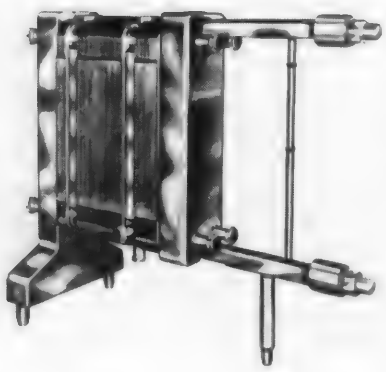
A Metafilter S/5 with dome removed showing packs.

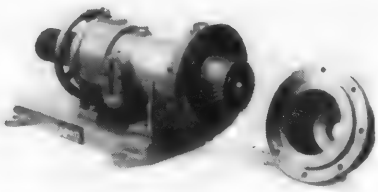
Pulping and sieving

The Pulping and Sieving Machine No. 1 made by William Brierley, Collier and Hartley, Ltd., has a totally enclosed protected motor clear of the floor. It consists of a cylindrical screen, various mesh sizes of which are available (including a rod sieve for stone fruit and a special pulper sieve with rectangular slots for allowing fruit cells to pass). Inside the sieve screen is a rotating axle carrying a pair of brushes which brush the pulp against the inner wall of the screen. Liquid

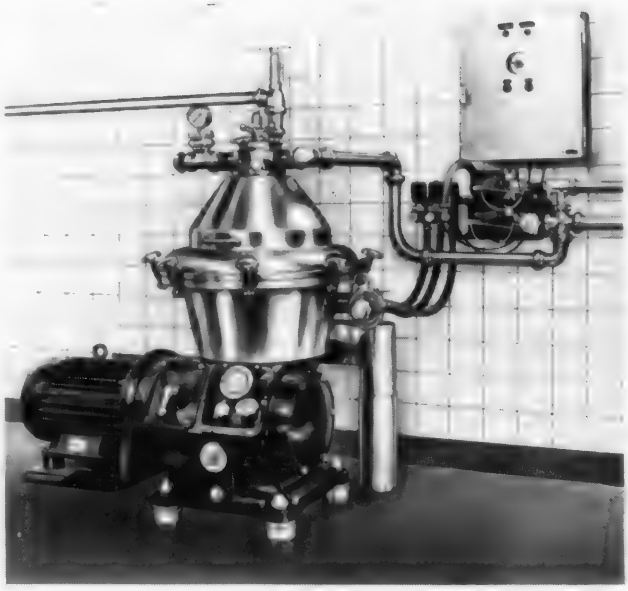


The No. 1 pulping and sieving machine made by Brierley, Collier and Hartley.





(*Left*): De Laval Plate type heat exchanger. (*Right*): De Laval BR-PX 309 self-opening separator complete with timing device which makes the operation fully automatic. (*Bottom Left*): The Moritz finishing mill reduces particles to very fine size by a shearing action. (*Below*): De Laval centrifugal pump shown dismantled.



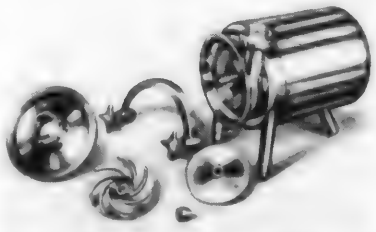
passes through and solid particles bigger than the screen size are retained. Various types of brush, both bristle and nylon, are available.

A separator made by Russell Constructions, Ltd., enables fruit juices to be strained through sieves of mesh varying in size from 16 to 200 mesh at outputs of up to 1,000 g.p.h. The makers say they will place their test department at the disposal of interested customers and will loan one of their machines should testing be required under production conditions.

Pumps

The Mono principle of pumping embodies a rotor moving in a rubber stator which achieves smooth discharge and requires no priming. The Mono Pumps, Ltd., *Kwikleen* pump has been designed for rapid dismantling and easy cleaning. The single mechanical seal can be sterilised with all the other components. It is said to have a suction lift of 25 ft. and is available for capacities up to 3,000 g.p.h. with a maximum pressure of 30 p.s.i.

The *Autostart* self-priming centrifugal pump manufactured by Girdlestone Pumps, Ltd., has an open type impeller which will pass small suspended solids. It has no valves and there are no fine working clearances. The pump body, priming chamber, and bearing housing are cast in one piece, and mechanical seals, suitable types of which are available for water and most acids, are fitted. Standard materials of construction are stainless steel or cast iron, but pumps can be supplied in gunmetal and zinc-free bronze if required.

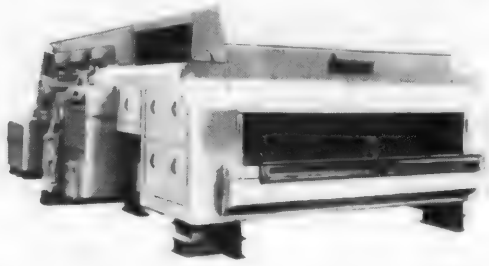


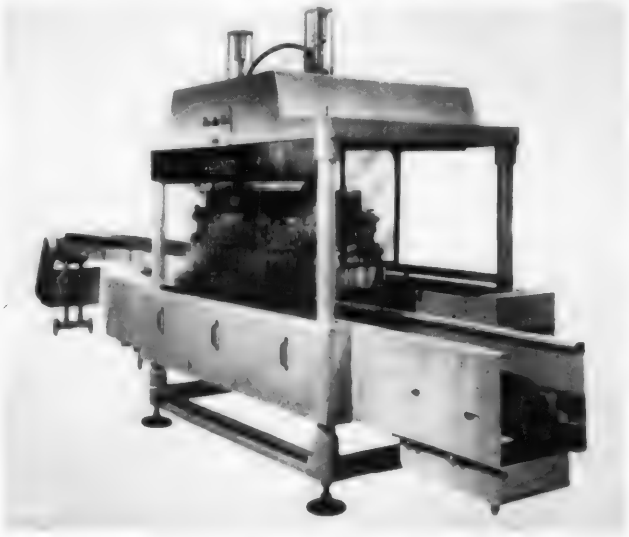
The Pulsometer Engineering Co., Ltd., manufacture a range of pumps of the centrifugal type for pumping liquids in bulk, among which are the Doulton stoneware pump and the milk pump. The former is made in three sizes, covering quantities from 1 to 450 g.p.min. and heads up to 140 ft. The latter is designed for quick dismantling for cleaning and sterilising and is said to have no crevices where impurities can lodge.

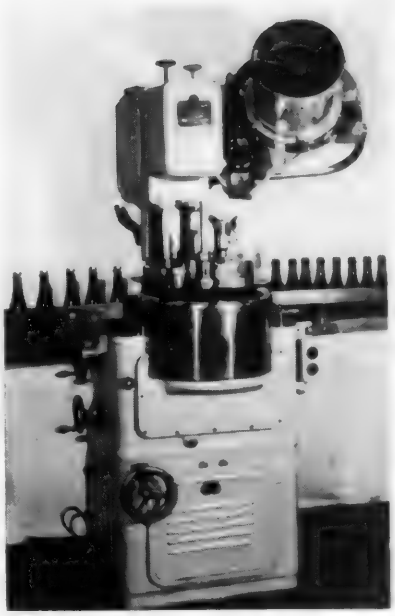
Filters and clarifiers

Sheet filters made by John C. Carlson, Ltd., are supplied in various sizes the most usual being 20 cm. and 40 cm. Filter plates are of stainless steel, lacquered aluminium alloy, or *Nolac*, a light alloy which does not require a protective lacquer. For certain fruit juices which do not filter well, a filter aid is added to the juice and every other plate in the filter changed for a

Two Dawson machines. (*Left*): The continuous soaker hydro bottle washing machine. (*Right*): The in-line automatic triple-head decrating machine.



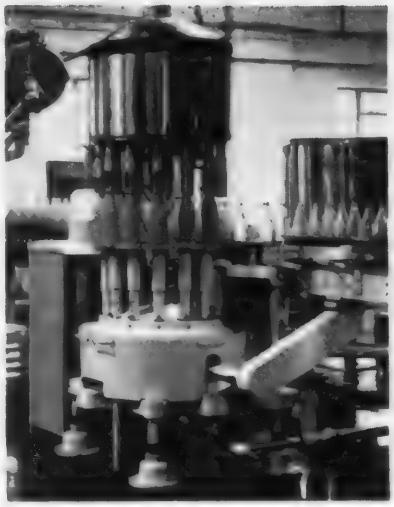




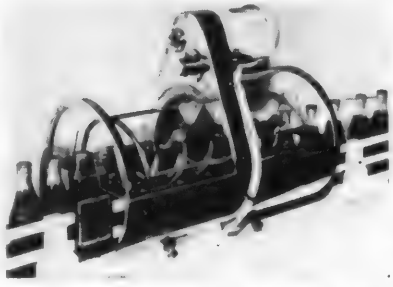
This automatic hopper fed machine with an output of 3-4,000 bottles per hr. is one of the various types of sealing machine made by the Alka Company.

turbid plate. Final filtration is then carried out in the normal way through filter sheets.

The *Stellar* filter made by the Paterson Engineering Co., Ltd., uses a cylindrical wire wound filter element as a support for diatomite filter media; the patented cleaning system uses air compressed by the incoming liquid, which enables the filter to be cleaned without dismantling. It can also be sterilised with steam when required. For fruit juice work the filters are supplied in stainless steel.



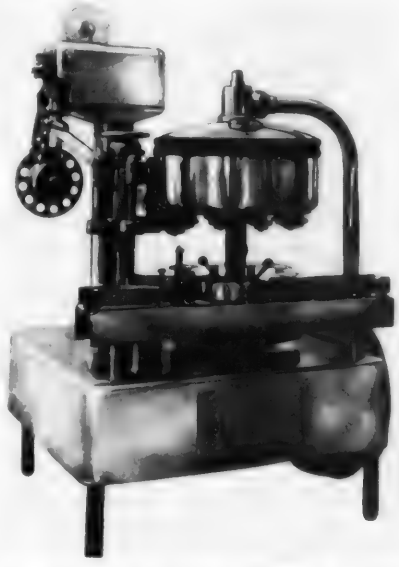
A Horix automatic rotary filling machine made by Sheepbridge Equipment, Ltd., bottling "Sunfresh" at Bullock's bottling plant at Bristol.

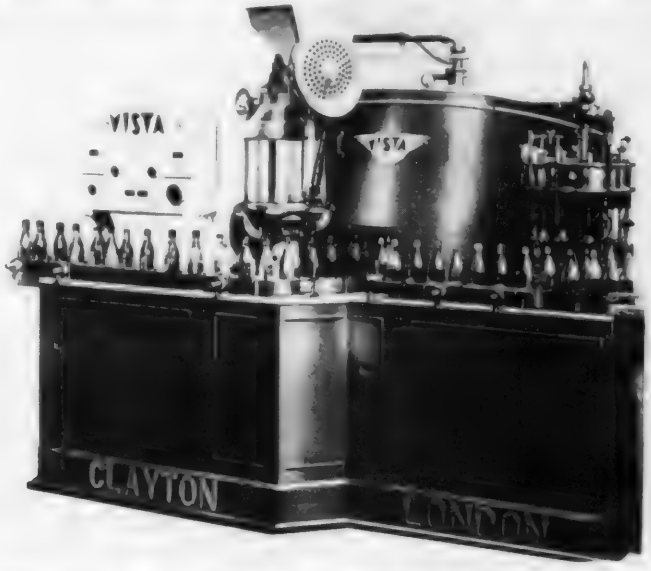


The Certus automatic beverage mixer Model K, available in three sizes, has an output up to 5,000 bottles per hr.

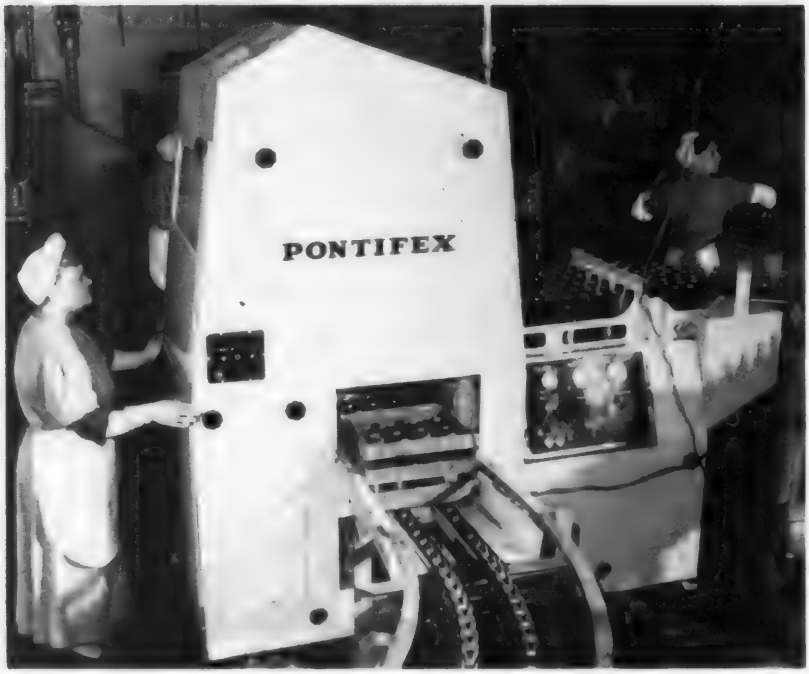
The Liquid-Solid Separations Hydrocyclone is designed to separate heavy solids from light in liquid suspension, and is suitable for de-sliming and de-gritting.

Auto-Klean Strainers, Ltd., manufacture a range of filters which are of all-metal plate type construction and can be cleaned without interrupting the flow of liquid by one complete turn of a handle. This action deposits the accumulated solids into a sump. A magnet inserted in the sump drain plug





Two fillers from the range supplied by George S. Clayton, Ltd. (*Left*): The 10-head FV filler with a capacity of up to 4,000 pt. bottles per hour. (*Right*): The 42 Vista syruping, filling and crowning unit.



The Pontifex patent case packing machine is electro-pneumatically operated and can handle all types of bottles at up to 400 per min.

gives additional protection against ferrous particles. Flow rates of up to 4,000 g.p.h. are available.

Filters made by the Metafiltration Co., Ltd., are designed for a wide variety of food products, including syrups and fruit juices. They are made of stainless steel and the volume of material left unfiltered at the end of each run is said to be very small. Various grades of *Metasil* filter powder are available.

Centrifuges

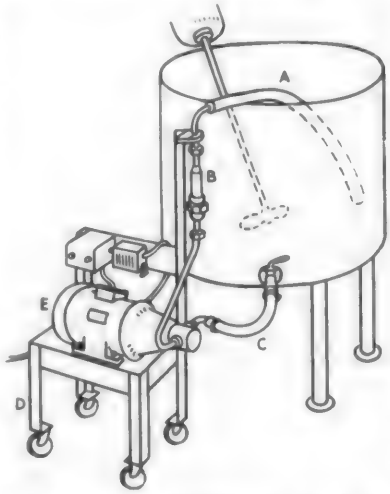
A *Hydrocyclone* manufactured by Liquid-Solid Separations, Ltd., is a wet centrifuge consisting of a hollow cone into which the liquid suspension is admitted under pressure. The rapid rotary movement of the pulp so produced forms two vortices, an outer one carrying the heavier solid particles directed towards the apex, and an inner one containing the lighter solids in the reverse direction. The hydrocyclones are rubber lined and are available in diameters from 15 to 900 mm. Capacity in relation to the size of the device is large, the 900 mm. unit having a capacity of 2,000 g.p.m. at a feed pressure of 40 p.s.i.

The Alfa-Laval Co., Ltd., make a range of equipment for handling fruit juices and soft drinks, among which is the De Laval Clarifier type K 212-30S. The bowl of this machine holds 65 litres of concentrated sludge, and consequently long runs can be obtained before cleaning. Throughputs of up to 500 g.p.h. can be handled. The juice is fed into the centrifuge by gravity or pump, while the clarified juice is discharged, by means of an integral impeller, under pressure and in a non-foaming condition. It can, therefore, be transferred to storage tanks without additional pumping. Such machines are used for apple juice, blackcurrant juice, etc.

Another type of centrifuge is the De Laval BR-PX 309. This machine has a special automatic system for sludge discharge while the machine is running at full speed. There are, consequently, no shut downs for bowl cleaning, and by means of a special timing device the whole process may be made fully automatic with no manual supervision. Such machines are applicable to the clarification of lemon juice, lime juice, etc.

In addition to the range of centrifugal separators, the De Laval plate heat exchangers are designed for the heating, pasteurising, and cooling of fruit juices. Heat exchangers are individually built to suit particular requirements, and are available for all capacities. The design is flexible so that if required two or more sections, i.e. heating and cooling, can be built on the same unit. They are of stainless steel construction and said to be very easily cleaned.

Also available is the range of De Laval easy clean stainless steel centrifugal pumps.



The Rapisonic homogeniser shown on mobile trolley. A—delivery hose; B—vibrating element; C—suction hose; D—fabricated trolley; E—pump unit.

Homogenisers and mills

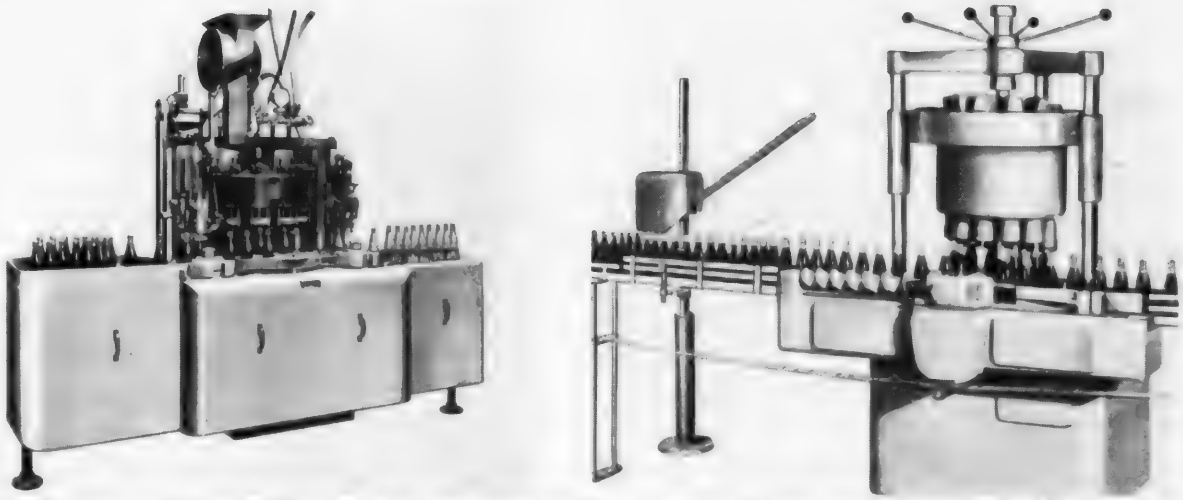
The fine grinding of solid particles and the emulsification of essential oils in liquids to be compounded into fruit drinks is an important field in which these machines are used. High speed machines of this type are sometimes called "colloid mills," but the term is a misnomer, for true colloids are not prepared by this means. The principle on which they work is the production of a shearing force in a thin film of liquid between two surfaces moving relative to one another at a very high speed. G. C. Hurrell and Co., Ltd., manufacture a range of mills of this type, in which the product passes between a rotor and a stator, the gap between which can be varied; in the model C series the gap is altered by changing the rotor; in the model B series the rotor can be displaced in an axial direction. Gaps of 0.001 to 0.03 in. may be obtained, with speeds of rotation from 3,200 r.p.m. to 8,500 r.p.m. Motors are available from 3 to 25 h.p.

The finishing mills manufactured by the Moritz Chemical Engineering Co., Ltd., consist of a male conical milling element revolving inside a female conical element. The product is circulated through the elements by a small centrifugal impeller fitted to the base. The clearance between the milling elements may be adjusted.

The *Rapisonic* homogeniser made by Ultrasonics, Ltd., consists of a liquid whistle in which the velocity of the liquid to be processed itself produces the sound energy. The high frequency vibrations give rise to cavitation in the liquid and consequent intense mixing and homogenisation. It is claimed that 60 gal. of an emulsion or fruit juice can be processed in one pass in 15 min. using a 2 h.p. motor. The *Rapisonic Mark IV* is now being marketed, and a laboratory model, the *Minisonic*, is available and can be used for small batch production.

Bottle washing

Among the bottle handling machines made by Dawson Bros., Ltd., is the continuous soaker hydro bottle washing machine, availabe in a range of sizes to handle from 7,200 to 24,000

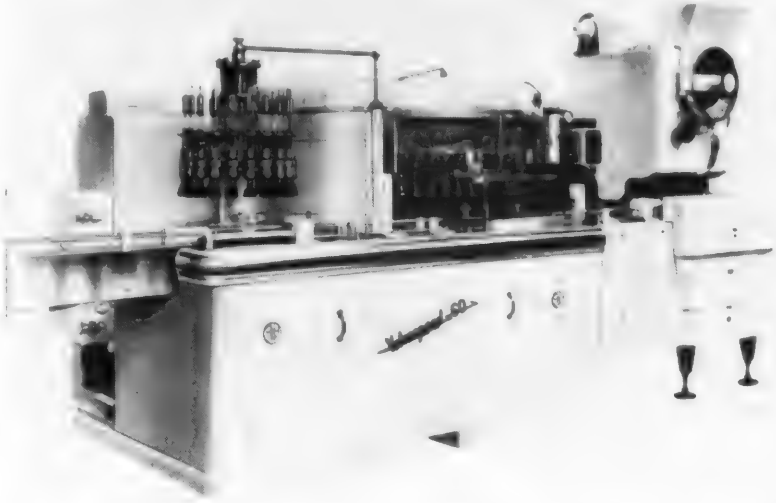


(*Left*): **The Meadowcroft Fastafil 200 bottling unit comprises a single head syruper, a 12-head counter pressure filler and a single head crowner.** (*Right*): **The Andersen and Bruun Super Multiplex high-speed automatic capsuling machine has an output of up to 24,000 bottles per hr.**

bottles per hr. It is a straight-through machine in which the bottles are carried throughout the treatment on a continuously moving conveyor. An automatic loader feeds the bottles into their holders to be given successively a hot pre-rinse, a prolonged soaking in tanks of hot detergent, a jetted detergent wash, a hot fresh water internal and external rinse, and finally a cold fresh water internal and external rinse from the mains. The bottles are then automatically discharged on to the bottle conveyor. Other machines made by the same firm are available to handle up to 24,000 bottles per hr. In addition, Dawson in-line decrating and recrating machines are available with one, two, or three heads to handle up to 24 crates per min. Separate heads are available for different sizes of bottles.

Filling machines

The range of *Horix* fillers made by Sheepbridge Equipment, Ltd., include gravity and gravity-vacuum fillers to handle liquids and semi-liquids of all kinds. Interchangeable parts are available to allow a single machine to fill many different kinds of product into a wide range of container sizes and types. Fully automatic, semi-automatic, and hand-operated fillers are obtainable with contact parts of stainless steel, steel, brass, or plastic as required. In the gravity-vacuum method of filling the vacuum equalises pressure in the container with that in the tank above the liquid; it does not draw the liquid into the container, which is done by gravity, so that there is no overflow and no loss of product through aeration or evaporation.



The Velvaspeed 60 made by Bratby and Hinchliffe Ltd. as supplied to Schweppes Ltd. is a combined 20-head syruper, 60-head filler and 10-head rotary crowner.

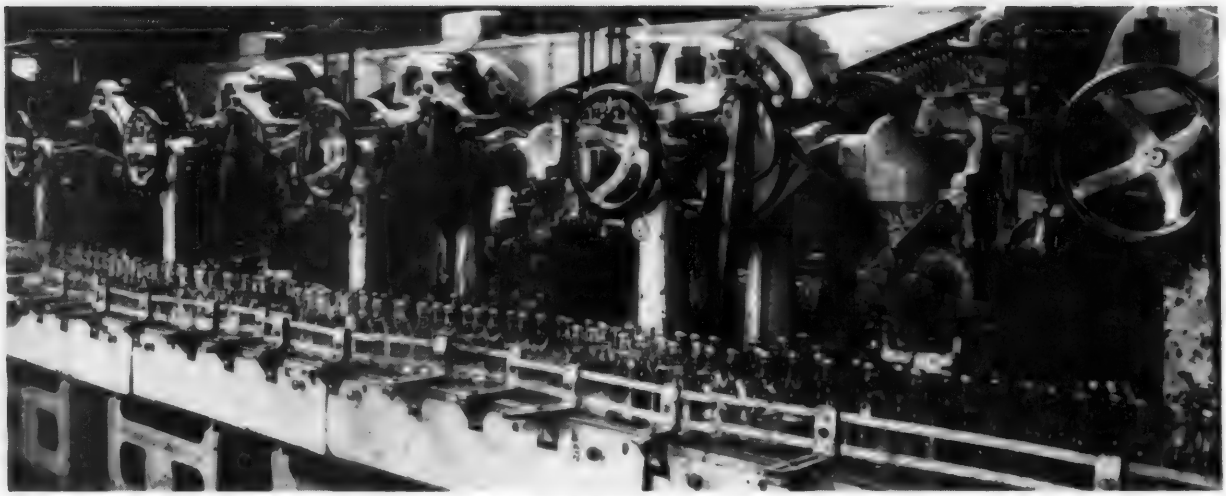
The *Velvaspeed 60* syruper, filler, and crowner made by Bratby and Hinchliffe, Ltd., embodies a 20-head stainless steel automatic syruper, 60-head filler, and 10-head rotary crowner. The filling heads are fitted with interchangeable variable flow nozzles so as to arrange the filling conditions to suit the beverage. The syruper is of the positive displacement plunger type with infinitely variable dose and is claimed to be completely drip proof.

The *Fastafil 200* bottling unit made by W. Meadowcroft and Son, Ltd., has been produced for the small bottler whose output does not justify the installation of large machines. It comprises an adjustable single-head syruper, 12-head counter pressure filler suitable for all types of bottles, and single-head crowner which can be replaced by a screw stoppering attachment when required. Driven by a 2 h.p. motor, it has been designed to give hourly outputs of 200 doz. 10-oz., 150 doz. 20-oz., 120 doz. 26-oz., or 80 doz. 40-oz. bottles.

The *Vista* range of counter pressure fillers made by George S. Clayton, Ltd., employ a domed stainless steel central reservoir fitted with individual water and gassing outlets to the filling heads, each of which is equipped with a transparent high-pressure chamber through which the valves may be inspected during operation. The filling ways cannot open until full pressure in the bottle is equalised, and therefore chipped or cracked bottles cannot be filled. If a bottle bursts, the filling head is automatically shut off.

Capsuling machines

Recently introduced by Andersen and Bruun (England), Ltd., is the *Super Multiplex* high speed fully automatic capsuling machine, which has an output of up to 24,000 bottles per hr. An autofeed unit places capsules in position on the bottles as they pass



A five head Purdy Rotamatic fully automatic machine in use at the Hendon factory of Schweppes, Ltd., for labelling tonic water.

along the line; a worm feed leads the bottles into a hydraulic sealing press with 12 rubber cap heads. Automatic safety devices guard against bottle breakages at each stage.

The Alka Company supply various types of sealing machine using their *Re-Alka* seal, which consists of an aluminium closure in which is inserted a polythene plug. The machines include a hand-operated model for small outputs, a semi-automatic machine, and a fully automatic hopper fed unit, with capacities ranging from 400 to 8,000 bottles per hr.

Beverage mixer

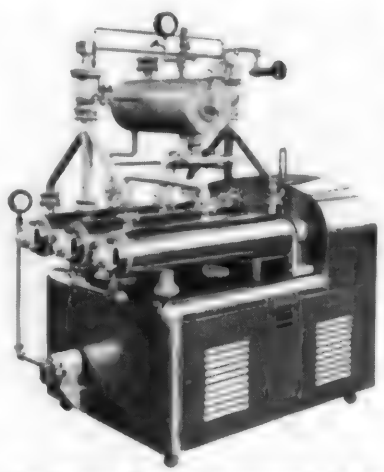
A fully automatic beverage mixer, the *Certus Model K*, supplied in this country by H. Erben, Ltd., mixes beverages after bottling by turning each bottle round three times on its diagonal axis before returning it automatically on to the conveyor. All parts are of stainless steel or chromium plated brass; the hood, which is of transparent plastic, permits the working of the machine to be seen. It is driven by an electric motor fitted with a safety clutch, and is available in three sizes, the largest having a capacity of 5,000 bottles per hr.

Case packing machines

The *Pontifex* case packing machine made by H. Pontifex and Sons, Ltd., has an output of up to 2,000 bottles per hr. It is possible to connect two or more lines of conveyor from filling and capping machines to feed the packer.

Adams Powel Equipment, Ltd., manufacture a range of bottle packers to suit outputs of from 8 to 26 cases per min. The packing cycle is entirely automatic, and the machine will not operate unless the correct number of bottles has been assembled in the packing head. The arrangement of pack is infinitely variable, and change-over equipment can be provided to make these machines almost universal. It is claimed that they will handle almost any type of crate or case, including fibre or corrugated cases, wooden trays, and metal crates. Three types of machine are available—semi-automatic, fully automatic, and a *Duplex* model.

The Adams Powel bottle packer handles almost any type of case or crate and is available for manual or automatic operation.



The Johnson Votator processing unit for continuous slush-freezing of concentrated fruit juices uses ammonia cooling.

Labellers

The *Pony Labelrite* labelling machine manufactured by Packaging Machinery (Peters), Ltd., applies a large variety of sizes and shapes of labels—plain, varnished or lacquered paper, or foil—to nearly al types of container, such as bottles, tins, cans, paper boxes, flat packages such as knock-down cartons, etc. The *Pony Label-Dri* made by the same firm dry-labels with a special label coated on one side with a plastic which can be activated by heat. The makers say that dry labelling is equally effective on glass, paper, metal, plastic, or wood. Printed or woven cloth for labelling can also be thermoplastic coated.

The *Rotamatic* series of labellers made by the Purdy Machinery Co., Ltd., have undergone continuous development since the introduction 40 years ago of the single head machine. The single-head model has a 1 h.p motor which drives both machine and conveyors, and multiple head models, from two to five heads, are available in which each head is driven by its own motor and is run independently, thus achieving maximum flexibility.

Other machines made by the same firm are the *Universal* labeller, and the *New Way* range of labellers for all-round labelling on round containers.

Continuous slush freezer

The *Votator* apparatus for the slush-freezing of fruit juice concentrates is made in the U.K. by A. Johnson and Co. (London), Ltd., under licence from Girdler Process Equipment Division, U.S.A. It is a heat exchanger which consists of one or more heat transfer cylinders each having a revolving shaft. These, together with the drive, product pump, and ammonia cooling system are mounted on a frame and enclosed in a cabinet. It is claimed that precise control can be maintained over time, pressure, and temperature.

FOOD MANUFACTURE
ANNUAL REVIEW

The Baking Industry

By Edmund B. Bennion, M.Sc. Tech., F.R.I.C.*

Change in trade structure ★ Flour quality ★ Continuous bread and cake production ★ Biscuit making ★ Research ★ Machinery for the small manufacturer ★ Refrigeration ★ Flour consumption

THE year 1958 may well go on record as a year in which more interest was shown in the survival and activities of the craftsman bread baker than in any year for more than thirty years. About that time the so-called "bloomer" crusty loaf was introduced to the London baking trade; the significance of this was that, for the first time, automatic production was becoming established, an event which was simultaneous with the gradual ousting of the cottage loaf, hitherto so popular in London, the Midlands, and the south, by the north-country tin loaf.

About thirty years ago, a group of enterprising craftsman bakers introduced this new attractive crusty long loaf which could be cut as easily as a tin loaf, and which moreover possessed a spongy, resilient crumb of uniform texture. It was made from a top-grade flour, and was enriched by the addition of fat, and, in some cases, of milk powder as well. It was something new and different from anything previously marketed both in size and shape. Being baked in steam, it possessed both an attractive appearance and a pleasing crisp crust.

During the past year, another generation of bakers, many of them the sons of those responsible for introducing the bloomer loaf, have promoted a guild of craftsmen bakers whose object is to produce good quality, attractive, crusty bread which will satisfy the demands of those who are continually crying out for such bread. Members of this guild will display a sign outside their shops to show that they are members, and the public will be educated to seek such bakers' shops if they wish to buy bread with individuality fresh from the oven.

Change in trade structure

It is a significant case of history repeating itself, that the rise of this guild of craftsmen should take place at a time when the trade is being consolidated into fewer and more powerful groups. During the year, a number of smaller businesses have been acquired by the milling combines, for various reasons. There are economic limits between which it is not profitable to run a bread-producing unit today, and businesses within this range are finding survival by combining with larger units, the effect of which is to produce a satisfactory economic unit, particularly with respect to bread production; it is with this aspect that the millers are especially concerned, since flour consumption by confectionery manufacturers is insignificant compared with that by bakers. There have also been several mergers of bakeries outside the orbit of the larger combines for the purpose of supplying a smaller group of bakers in a particular area. These amalgamations are having their repercussions on the labour market, affecting not so much the adult and semi-skilled labour force, as the intake of apprentices. The reason is that the closure of so many smaller bakeries, in which the ratio of pupils to skilled workers is higher than in the larger units, has caused the number of employers to decline. In view of the increasing number of school leavers, the problem is causing concern in official quarters.

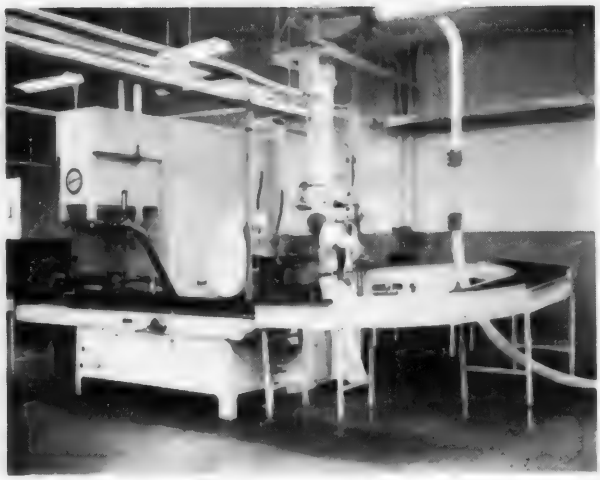
* Head of the Department of Food Technology, Southampton Technical College.

Flour quality

During the year, flour quality has caused little worry. Consistency has been maintained, and the seasonal variations which hitherto have caused much concern have not been so apparent. There have, of course, been slight variations in strength as changes in grist took place, usually followed by minor variations in yield, but for the most part the baker has not been called upon to make any major changes in his fermentation systems.

Imported flours have been in plentiful supply and have been used with advantage by the family baker and by certain larger groups for the production of certain types of bread. It is significant that the nature of these flours has changed over the years, which has made them more easily handled in British bread-making processes.

For confectionery work, high-protein cake flours continue to be developed, and they arouse interest, but time alone will determine the extent to which they will replace the more conventional types for the making of traditional English varieties of cakes. High ratio flours for special types of cakes are constantly under review, since the successful use of such flours depends on their suiting the types of fats which



(*Left*): **Wallace and Tiernan broth fermentation tanks.** (*Right*): **The Wallace and Tiernan "Domaker."**

are being developed for use with them; these fats are gradually being improved, bringing them nearer to the best American standards. A foaming test for the quality of high ratio flours has been standardised which should prove extremely useful. The use of winter wheat flours, however, could well be extended, particularly in the smaller bakeries; in this connection the introduction of smaller packs would be most helpful since they are more easily handled, and would permit the confectioner to carry a wider range of flours to suit his particular lines of confectionery, so enabling better results to be obtained in his products. In England, the confectioner has not paid sufficient attention in the past to the types of flour he has used in his goods, whereas in Scotland and Northern Ireland winter wheat flours have been a necessity, and from these and other flours suitable blends have been made as required for various types of cakes. Perhaps with the decline in flour consumption the miller will pay some attention to this, although it may mean alterations to his packing plant. It is, however, customary to pack smaller bags for ships' stores, and there seems no reason why the same pack cannot be used for the home market.

Continuous bread production

During the past decade there have been tremendous developments in automatic bread plants, but these have been directed mainly towards improving the traditional methods of making and handling dough, baking it, and subsequently dealing with the baked product so that it reaches the customer sliced and wrapped with the minimum of handling.

These plants demand highly skilled technical staffs and management to operate them if bread of a consistent character with good keeping qualities is to be obtained. One of the qualities necessary must be the ability to judge fermentation. With the introduction of the "brew" process for breadmaking and continuous mixing, followed by deposition of the dough ready for baking, continuous breadmaking has now arrived, and although the same judgment of fermentation may not be called for, a greater degree of technical control and mechanical skill is demanded from those who operate the plants. With the introduction of more mechanical controls the quality of the personnel operating them must be high, otherwise serious losses will occur which will be all the greater because of the continuous nature of the process. Push-button control may eliminate many of the troubles, but it calls for a new type of personnel in the bakery.

Bulk handling of flour is increasing, and so is the practice of subsequently distributing it throughout the bakery by pneumatic suction, particularly when continuous mixing is carried out. The method is proving more economical.

For continuous breadmaking a brew must first be produced in stainless steel tanks. This brew consists of the yeast, sugar, salt, water, and other ingredients which are to be used, including the fat which would most probably be emulsified with glyceryl monostearate. This broth is allowed to develop for two hours at 80°F.

The dough is mixed in a pre-mixer, the flour being drawn from storage bins which hold sufficient for a half-hour run, dependent on the capacity of the plant. After passing through a heat exchanger, the broth is added at a predetermined rate, and the dough is then pumped through stainless steel pipes to the developer, from which it is deposited into the pans. The pre-mixer and the developer are controlled by switches on a control panel, and the rate of flow must be accurately controlled otherwise consistent results cannot be obtained. The actual mixing time is $3\frac{2}{3}$ min., and the total time from starting up the plant to commencement of depositing in pans is approximately 5 min. The time in the developer is about 60 sec., whereas under normal fermentation conditions this would take 3 to 4 hr., depending on the process.

Advantages of continuous process

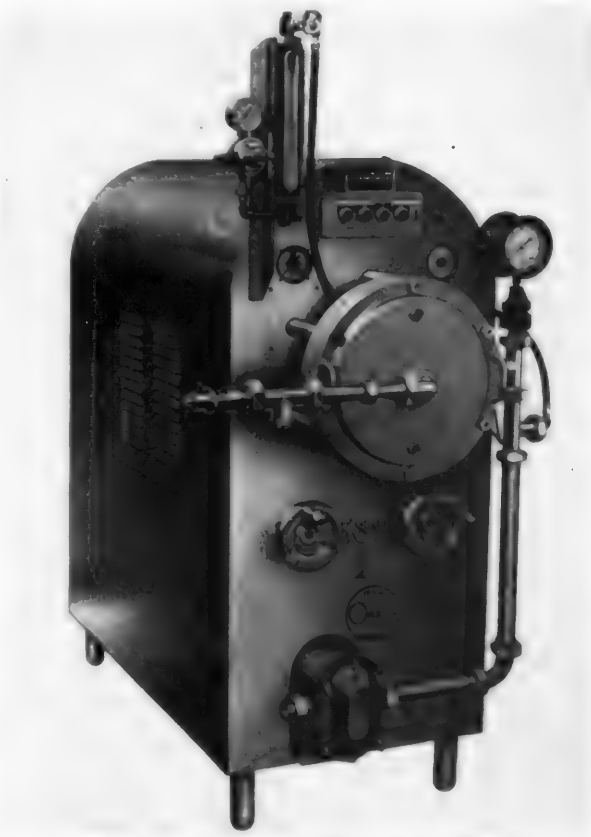
The advantages claimed for the process are considerable. Speed of production is increased, for from

24 to 90 pans can be deposited per min. Saving of space is very considerable, since as no dough fermentation floor space is required only a third of the normal space is needed. The accuracy of scaling is within 4 g. per pan, and greater yields are obtainable for a variety of reasons. Lastly, it is claimed that production costs can be lowered because less labour is required to operate such a unit. An interesting point is that the losses from breakdowns would be very much reduced since the actual amount of dough made at any one time would not exceed 200 lb. This is the basis of the *Domaker* process now being developed in this country by Wallace and Tiernan, Ltd.

Continuous cake production

Similar progress has been made on the confectionery side of the trade. Many years ago the introduction of the pressure whisk revolutionised the making of sponge goods, and since then the continuous Swiss roll making plant has been developed. Although the mixing process then was not continuous on any one mixing machine, continuity of mixing was easily maintained by having a series of machines running in parallel which fed a central depositor situated on the plant feeding into the oven.

The continuous cake-mixing machine marketed by E. T. Baker, Ltd., now goes a lot further, for this is a machine for dealing with all types of cake. With this machine it is now possible to supersede the normal batch process of cakemaking.



The Oakes continuous cake mixing machine.

With normal batch mixing the total quantities of ingredients are placed in a mixing bowl in predetermined amounts and order, so that mixing proceeds stage by stage until all the ingredients are thoroughly mixed and a clear batter is obtained. With the new continuous mixer the ingredients are fed in at such a rate that mixing and emulsification is going on all the time under the most hygienic conditions. This type of machine is admirably suited for all types of layer cakes since the mixing head produces a perfect emulsion of the ingredients. It is thus obviously not designed to deal with fruit cakes. However, an adaptor is available to allow fruit to be mixed in, but despite this adaptation this method of production is not likely to be used for the production of richly fruited cakes, such as wedding cakes, for a long time.

Biscuit making

Continuous production has always been the keynote of biscuit making. However, no plants parallel with those being developed for breadmaking and cakemaking have yet been developed, although laboratory-scale work has been carried out on a Buss Mixer.

During the past year a new C.W.S. biscuit plant has been opened at Harlow, Essex, where the production target is 15 million biscuits, representing about 100 tons per week. There will be four production lines in operation, all of them fed by specially designed high-speed mixers, which will provide a continuous flow of doughs. Flour and sugar are delivered in bulk to the bakery and are unloaded pneumatically. Weighing and mixing of the ingredients is by push button control through the Simon control panel.

Mixing times on high and low speeds are automatically controlled, after which the doughs make their journey through the presheeter units where the dough is reduced to the required thickness for each type of biscuit. From here the dough is stamped out and the biscuits pass through the ovens, then to coolers and packing machines. This unit represents some of the most advanced ideas as yet for biscuit production.

A description and photographs of the new C.W.S. biscuit plant at Harlow appeared on p. 512 of the December, 1958, issue of FOOD MANUFACTURE.

Research

During the year further work has been done at the British Baking Industries Research Association's laboratories on the problem of crumb softness in bread, some of which is of mainly academic interest. Practical help has been given to many members of the Association in dealing with problems of bread storage and preservation, particularly in the prevention of spoilage from mould and rope. Rope is fairly easy to control, but mould spoilage requires much more attention than has previously been given.

Work has also been carried out on dough testing instruments, and on the design of flow tests in an endeavour to solve the thorny problems of flow specifications and standards for bakers and other flour users.

In the confectionery field, work on emulsification and stability of cake batters has been continued. Tests are being carried out on the relative baking qualities of eggs from hens reared by the battery and those on free range. Other work carried out has been on subjects such as the effect of refrigeration on flour confectionery; retention of moisture in cakes, curds, and jam fillings; determination of coconut in bakery products; flavours for use in butter, cream, and cakes; the use of silicone-treated vegetable parchment paper for cake tins and baking trays; the continuous mixing of cake batters, and storage problems and the testing of samples of fat. In the biscuit field, physical measurements on biscuit and wafer flavour and their relation to baking practice have been studied, as well as the checking and cracking of biscuits.

Many samples have been examined for quality and for the presence of extraneous matter. The microbiology of biscuit flour has also been studied with particular reference to the association of fat-splitting organisms and the production of soapy off-flavours.

Some new bakery machines have been examined, and new methods of improving hygiene in bakeries through attention to pest and rodent control have been studied. Surveys of constructional materials have been made, and courses on works simplification initiated. Attention has been paid to physiological studies, including pharmacological and nutritional aspects of raw materials, and to processing and hygiene aids and their introduction into bakery practice.

Machinery for the smaller manufacturer

Machinery manufacturers in the past have frequently been criticised for not providing adequately for the smaller baker. These criticisms came particularly from those progressive members of the trade who had attended the large Continental exhibitions where many machines designed primarily for the craftsman baker were displayed. Although some of these deficiencies are gradually being rectified, there are still no counterparts in this country to many of the foreign machines. Progress is being made in smaller automatic units which help to save labour costs and to maintain a more uniform standard of production.

Attention is being paid to oven design, and the principles of convector heating are being incorporated in most of the larger types of continuous baking ovens. The new turbo-radiant ovens incorporate air-movement other than by normal convection, and by this means, as well as by new methods of all-round heat radiation, baking times have been reduced to less than half an hour.

Refrigeration

Intensive studies have been made during the past year on the effect of refrigeration on dough retardation; great progress has also been made in the extension of the use of deep freeze methods for bakery products, and many very large units have been installed. As these have been developed and the problems concerning the freezing of the various materials have been overcome, the secondary problems of the treatment of the materials during the defrosting period have been found to require special consideration. Many of these problems still remain to be solved, but so widespread is the use of deep freeze and so many are the interests involved, that solutions to these problems are not likely to be long in coming.

Flour consumption

The consumption of flour continues to decline despite vigorous publicity both by advertising and lecture campaigns. Women's organisations are taking considerable interest in the work of dietician lecturers, but in spite of the publicity efforts the overall consumption of bread does not seem to be influenced to any great extent. However, the increasing publicity given to crusty bread balances the greater interest the craftsmen bakers are paying to the production of such bread. At any rate, the present advertising campaigns are at least keeping bread well to the forefront. It is possible that the considerable attention which is being given in the bakery trade press to the production of fancy and unusual types of bread may stimulate the public awareness of such products, with resultant increase in consumption.

"Sunfresh"

(*Concluded from page* 103)

the supervisor in charge of the line dials the appropriate number, which is recorded on the chart in the managing director's office, so that the management can see at a glance which production lines are stopped and why.

Engineering and carpentry

There is a well-equipped engineering shop to deal with normal maintenance and repair work, and the factory also services its vehicles in its own garage. In the engineering shop is also carried out the making and repair of syphon bodies. The carpenter's shop deals with the repair and assembly of crates and cases, and the spray varnishing of new cases. The firm find it cheaper to buy ready-cut wood for cases and to assemble them than to buy the finished cases.

This expanding industry is very keenly competitive, and although not as seasonal as it was, is strongly influenced by the weather and by the fortunes of the tourist industry. The firm therefore find it a great advantage to be located on the south coast, and are steadily adding to their established reputation by continual improvement of processing standards and by keeping abreast of latest developments.

The Problem of Improving Nutritive Value

With Special Reference to the Enrichment of Foods—7

By E. Menden and H. D. Cremer*

In this concluding article the authors survey the results of three enrichment studies and review some of the more important compulsory enrichment regulations in force in different countries.

(d) SOME NOTES ON THE RESULTS OF THREE ENRICHMENT TRIALS CONDUCTED OVER LONG PERIODS OF TIME

The enrichment of flour and bread in Newfoundland[76, 308, 309]

IN June, 1944, at Norris Point, Newfoundland, a detailed survey of the average nutritional status of the population was completed. The results of this nutritional study persuaded the government of Newfoundland, in the following September, to call for the compulsory enrichment of flour and bread according to the usual U.S. standards (which require supplements of vitamin B_1, vitamin B_2, nicotinic acid, and iron); the compulsory enrichment of margarine with vitamin A followed in 1946.

In July, 1948, the nutritional status of a large number of families was once more examined, in exactly the same way as had been done four years previously. Most of the nutritional disturbances observed earlier were less evident, and appeared less frequently than during the survey made in 1944. In particular, a significant decline in the symptoms of vitamin B_2 deficiency was established. A change in the deportment and behaviour was noticed in the children; the visible lassitude observed in 1944 was less frequently seen. Similarly the mortality rate amongst the children—which had been a grave fault in the general health and nutritional status—showed marked improvement: in the city of St. John's the relative figures were: 117 (in 1944), 92 (in 1945), 77 (in 1946), and 61 (in 1947). The improvements could clearly be traced to the enrichment of flour and bread with the B-complex vitamins.

The enrichment of rice in the Philippines[24, 141, 310]

In August, 1948, widespread deficiencies of the B-complex vitamins (and of several other nutrients) were demonstrated in surveys made on the nutritional status of the people in the Bataan Peninsula, in the Philippines; in particular, the prevalence of beriberi was recorded. As a consequence, the value of the enrichment of rice (there, the staple food)—with vitamin B_1, nicotinic acid, and iron—was investigated in October, 1948. This experiment in enrichment extended over the whole of the Bataan Peninsula with its population of 90,000.

Two years later, in December, 1950, another similar survey was made; and this showed an essential improvement in the nutritional status; the typical symptoms of deficiency in vitamin B_1, nicotinic acid, and iron—which two years previously had been everywhere observed—no longer appeared. The mortality from beriberi, which had amounted in 1947/48 to 263 per 100,000, had been reduced to 28 per 100,000 in 1949, and in 1950 to nil.

The enrichment of a complete diet for heavy workers[311]

There is in Switzerland a building project called the "Grande Dixence" where about two thousand workers are busy erecting the "highest dam in the world" at elevations of between 2,200 and 2,900 metres,† and over a period of fifteen years. The site of the building project is about 30 kilometres‡ from the nearest large settlement in the Rhone valley. The food is prepared in communal kitchens, and there is no free choice of additional items of food. Both labourers and other employees after being exposed for months to this diet showed latent, and even visible, symptoms of deficiency (as is to be expected with almost any communally prepared food). These symptoms were verified by clinical work (such as the compilation of a series of blood pictures and prothrombin clotting-time tests) in the project hospital. It appeared to be impossible to remove these deficiency-symptoms by changing to a so-called "Health Nutrition" diet, a regimen which includes little or no "refined" foods, and large amounts of fruits, vegetables, and milk.

It was not unlikely that, even after the most powerful persuasion, such a planned diet would be firmly rejected by the workers; and, understandably, the management could not run this risk. Consequently, the methods of enrichment were used to improve the ordinary diet with the pure vitamins and the necessary minerals.

It is interesting that these essays in enrichment were made when possible without the knowledge of the workers; the principle had been accepted that information about additions to food would be too often falsely interpreted—particularly amongst men living in a barracks-like community; it would

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† 7,000 to 9,500 ft.
‡ About 19 miles.

create distrust and cause protests. Even the best explanation, no matter how well composed, psychologically accurate, and properly delivered, may fail utterly against this kind of mass-resistance to new ideas.

The practical implementation of the enrichment programme was as follows:

(i) in the mill the following supplements were mixed per ton of flour for bread: 4·18 g. of vitamin B_1, 2·42 g. of vitamin B_2, 30·44 g. of nicotinic acid, 131·44 g. of $FeSO_4 \cdot 7H_2O$, and 10 kg. of stabilised wheat-germ;

(ii) in the dairy, oily solutions of the vitamins A and D were mixed with the butter —to every 100 kilos, 24,000,000 I.U. of vitamin A and 2,550,000 I.U. of vitamin D;

(iii) vitamin C was given partly in the form of tablets (100 mg. per head per day, partly as an addition to candy called "energy sugar."

The total cost of this enrichment amounted to 0·03 DM* per head per day, or an average of 9,000 DM per 1,000 workers per working year of 300 days. However, the improvement in health and in the resistance to disease—as well as the increase in energetic activity and in the pleasure of going to work—were out of all proportion to this relatively insignificant cost.

(e) STATUTORY ENFORCEMENT OF ENRICHMENT

Enrichment is effective only if it is properly and intelligently implemented — and always in accordance with the latest facts known to the science of nutrition. To ensure this, adequate legislation is essential. In conclusion, therefore, a brief review of the more important current compulsory regulations, which are being applied to enforce enrichment in different countries, is given below.

* 0·03 DM = 0·6 (say, two-thirds) of a penny. 9,000 DM = £750. (DM = German Deutsch Mark.)

Germany

There are no statutory obligations regarding the enrichment of foods in Germany. The manufacture of "vitaminised nutrients" is controlled by the ordinance released on September 1, 1942, regarding the addition of the vitamins to foods; according to this, "foods the vitamin content of which is totally or in part attributable to the addition of natural or of synthetic vitamins or of substances particularly rich in the vitamins; or to the application of chemical, physical, or biological processes" could be offered for sale, with reference made to their vitamin content, only if they had been registered with the National Public Health Institute (now with the State Public Health Departments).[135] The "provitamins" are also considered as vitamins. The authorities can limit, or prohibit, all commerce in foods to which vitamins have been added. Compared with the extensive legislation which exists in this sphere in other countries, this ordinance is no longer adequate for present needs. Thus, there is no answer even to the question of how large supplementation with the vitamins should be in order to justify the description "vitaminised" or "enriched." Numerous suggestions have been made for improvements in the ordinance;[312, 313, 314] as an example, the demand has been made that any statement made regarding the addition of any of the vitamins to foods should be accompanied by a declaration of the percentage of the daily requirement of this vitamin which would be provided, by a recommended (and practically possible) daily amount of the respective food.[312]

Three principles have been proposed according to which an ordinance governing the large-scale enrichment of foods (and for correcting inadequacies in certain nutrients) could be perfected:[136] (i) only appropriate food factors should be added to individual foods—namely, the B-vitamins to cereals, vitamins A and D to oils and fats, vitamin C to fruit and vegetable products; (ii) the amount of any food factor added should be exactly defined by scientific advisers to the administration working in conjunction with specialists in industry; in doing so, the daily requirements of the vitamins and the minerals and the "natural" content of the products under review, should be taken as the working bases; (iii) all enriched foods should be subjected to periodic examination in order to avoid fraud and deception of the consumer.

The enrichment of low-extraction flour (for bread) is already being undertaken for use in the German armed forces. This enrichment was the result of recommendations contained in the specifications of quality necessary for the continued maintenance of the armed forces.[254] Enrichment is not yet compulsory.

Brazil (State of Sao Paulo)

Theoretically, the enrichment of wheat flour has been compulsory in Sao Paulo since 1952: enrichment must be undertaken in the mills, and is controlled by the government; the importation of un-enriched wheat flour is prohibited.[135] However, it has to be admitted that the law governing enrichment has never yet been enforced in practice because the government has not so far granted the necessary foreign exchange to cover the importation of the vitamins.[144] The addition of vitamins to margarine has been compulsory since July, 1952.

Chile

Since 1951, all flour in Chile must be enriched according to law.[135]

Denmark

Ordinances exist in Denmark governing the enrichment of margarine (ever since 1937), and of low-extraction wheat flours (since 1953). Preparations considered for enrichment must first be approved by the government, and the finished products are under government control. The importation of un-enriched wheat flour is prohibited.[53] In general, the enrichment of a food is approved

or recommended by the Public Health Department only if it is conceded that the national requirement of a particular food factor is not already fully covered.[135] As a consequence of some extensive surveys which have been conducted on the nutritional status of Greenlanders, dried milk solids (transported so far away!) have been enriched with vitamin C since 1956. The reconstituted milk prepared from them contains 100 mg. of vitamin C in a litre.*

England

By order of the Minister of Food all margarine in England was enriched with the vitamins A and D during the war and in the years immediately following. This ordinance was repealed in 1954 and another law was substituted for it —but the basis of the new law still makes the fortification of margarine compulsory. In England, during the war, flour was supplied with a calcium supplement only. Since 1953, legislation has required that all flour which is not subsidised by the government† must be enriched with the vitamins and minerals. Following the suspension of the bread subsidy, a new flour enrichment ordinance came into operation on September 30, 1956; this requires the following minimum contents of the vitamins or of iron for all types of flour regardless of the extraction rate: vitamin B_1 = 2·4 mg. per kilo; nicotinic acid = 16 mg. per kilo; iron = 16·5 mg. per kilo;[144] in addition, all flour other than whole wheat must contain a calcium supplement (see Table II). The basis of these new "Flour (Composition) Regulations"[315] was a report since become known as the "Cohen Report" which was produced by a panel (under Professor Sir Henry Cohen) appointed jointly by the Secretary of State for Scotland, the Minister of Agriculture, Fisheries, and Food, and the Minister of Health. The purpose of this report was to determine the composition and the nutritive value of flours of various extraction-rates (and the bread made from them), and enriched flour. The conclusions of the report established that enrichment specifically with vitamin B_1, nicotinic acid, and iron, is necessary, particularly since "Flour, or the bread made from it, contributes nearly a third of the total calories and protein of the average British diet; it is, therefore, important that the flour should be as nutritious as possible . . ."‡ There are no special trade regulations regarding enriched foods in England; but general instructions are given in the "Labelling of Food Order" of 1953 and in the "Defence (Sale of Food) Regulations" of 1943.[136]

France

There are no special regulations governing enriched foods in France. However, there are certain guiding principles, sanctioned by the law to assist trade in those foods which have vitamin contents. According to these principles "natural" vitamin contents may not be declared. When natural products, rich in the vitamins are added, a statement of the kind, and of the amounts, of the vitamins present is allowed. The addition of the synthetic vitamins to foods is forbidden by an ordinance of 1912 which has not yet been revised; according to this law, foods which contain the synthetic vitamins are classified as "pharmaceuticals" and may be sold only by pharmacists.[135]

India

Since December, 1953, the addition of vitamin A to "Vanaspati" has been legally required in India.[304]

Canada

The enrichment of flour and bread has been permitted in Canada since 1953, when the existing bread standards were appropriately revised; it is not legally enforced. However, enrichment, undertaken as a voluntary measure, is subject to regulations which impose standards.[135] It is to be particularly emphasised that the addition of the vitamins to flour may take place only in the mill in Canada; the regulation is based on the conviction that truly effective, technically accurate, and properly controlled enrichment can occur only in the mill.

Sweden

There are no legal regulations governing the enrichment of foods in Sweden. However, the enrichment of wheat-flour is permitted, and this has been undertaken by the co-operative stores ever since 1944. Most of the wheat-flour now on the market is enriched.

The retail trade in foods with added vitamins is controlled by the "Ordinance regarding the Production and Importation of Vitaminised Foods." According to this regulation, "vitaminising" measures are understood to be (i) the addition of substances containing the vitamins, (ii) ultraviolet irradiation, or (iii) the addition of the vitamins to foods by any other means of increasing the natural vitamin content. Enriched foods are approved for general commerce by the government only if the enrichment is regarded as important to national nutrition; control surveys are required at least twice a year.[135]

Switzerland

Other than that requiring a supplement of iodine in table salt there are no legal regulations governing the enrichment of foods in Switzerland. The enactment which appeared in March, 1957, and which has been enforced since June, 1957, by the Department of the Interior of the Swiss Federation dealt with supplements of, and recommendations concerning, the vitamins in foods; it is now the standard for the trade in foods containing the vitamins.[316] According to it, the addition of a vitamin should be made, first, to those foods in which the vitamin concerned has suffered loss during processing; and no more of a vitamin should be contained in an average daily portion of a food

* E. Uhl. Principles of enrichment of foods. *Int. Z. Vitaminforschg.*, 1957, **28**, 168.

† The so-called "National Flour."

‡ Quotation from the "Conclusions," Section (10. 3), of the "Cohen Report" (page 25).

than would correspond to the average daily requirement. The enactment contains details of the "average daily requirement," and lists the "daily portion" for many foods.

U.S.A.

During the Second World War the enrichment of all flour intended for dietary purposes was made compulsory in all states of the U.S.A. This ordinance was repealed in 1946. Since then there has been no legal obligation at the federal level to enrich foods, but the individual states are tending increasingly to make compulsory the enrichment of all wheat flour and bread with vitamins and minerals. At present, such ordinances already exist in twenty-seven of the states, as well as in Hawaii and Puerto Rico.[251] The enrichment of corn is also legally required in California and in Louisiana. A law in South Carolina, promulgated on July 1, 1956, requires the enrichment of rice. The enrichment of rice is to be generally undertaken in the near future in all the States of America where there is a high consumption of rice;[144] the kinds and the quantities of the vitamin and mineral supplements will be largely regulated according to the "Definitions and Standards of Identity" of the "Federal Food, Drug, and Cosmetic Act."[157]

The enrichment of margarine is voluntary in the U.S.A., but it must conform with the guiding principles of the "Definitions and Standards of Identity." The kind of vitamin added must be declared; but no levels are prescribed.[135] The same regulation applies to the enrichment of milk with vitamin D. In general, the rulings of the "Federal Food, Drug, and Cosmetic Act" of 1938, together with the ordinances of the individual states, are the deciding legislative measures in controlling the enrichment of food in the U.S.A. According to these laws, the enrichment of any food with vitamins cannot now occur on the initiative of a manufacturer alone if vitamin supplements have not already been officially prescribed for the food; on the other hand, the uniform enrichment of important staple foods is made possible.

The fundamental deciding principles controlling enrichment measures in the U.S.A. are:[317]

1. With carefully defined limitations, the principle of the addition of specific nutrients to certain staple foods is endorsed for the purpose of maintaining good nutrition as well as for correcting deficiencies in the diets of the general population or of significant segments of the population. The requirements for endorsement of the addition of a particular nutrient to a particular food include (*a*) clear indications of probable advantage from increased intake of the nutrient, (*b*) assurance that the food item concerned would be an effective vehicle of distribution for the nutrient to be added, and (*c*) evidence that such addition would not be prejudicial to the achievement of a diet good in other respects. These requirements have been met in the specific cases indicated in paragraph 6 below.

2. The desirability of meeting the nutritional needs of the people by the use of natural foods as far as practicable is emphasised, and to that end education in the proper choice and preparation of foods and the betterment of food production, processing, storage, and distribution so as to provide more fully the essential nutrients native thereto are to be encouraged.

3. In order to avoid undue artificiality of food supply, foods chosen as vehicles for the distribution of additional nutrients should be, whenever practicable, those foods which have suffered loss in refining or other processing, and the nutrients added to such foods should preferably be the kinds and quantities native to the class of foods involved.

4. The addition of other than natural levels of nutrients to foods which are suitable vehicles of distribution may be favoured when the addition will be advantageous to the public health and when other methods for effecting the desired purpose appear to be less feasible.

5. Whenever technological and economic developments lead to extensive reduction in the consumption of a staple food, with a consequent nutritionally significant reduction in the intake of an essential nutrient or nutrients, consideration by qualified bodies should be given to the desirability of restoring such nutrient or nutrients to the dietary.

6. The endorsement of the following is reaffirmed: the enrichment of flour, bread, degerminated corn meal, and corn grits; the nutritive improvement of whole grain corn meal and of white rice; the retention or restoration of thiamine, niacin, and iron in processed food cereals; and the addition of vitamin D to milk, of vitamin A to margarine, and of iodine to table salt.

There are certain regulations concerning the enrichment of food for the "U.S. Army" which, whilst observing the guiding principles of the "Federal Food, Drug, and Cosmetic Act" in general, nevertheless often require high supplements of food factors because of the different demands arising from "camp-maintenance"; in addition, particularly strict regulations covering the manufacturing, packing, and inspection of all foods are enforced because conditions of tropical, or of arctic, storage have to be considered.[101, 158, 247]

This work was made possible by a research commission from the Minister for Defence of the German Federal Republic. We are indebted to Dr. Henzel of the U.S.A. for the translation.

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(*Continued on page 126*)

Advances in Food Technology

FRUIT

Manufacture of Purées

Frozen fruit juices can be best preserved in hermetically sealed containers. Surface oxidation can best be avoided by closure under vacuum, by covering the surface with a sugar solution containing added antioxidant.

The purée is best produced from soft ripe fruit in order to obtain a product of high flavour. As the fruit is being pulped, a great amount of air is dissolved in the juice so that when freezing, the lower the temperature used, the slower oxidation occurs. The most successful method is stated to be to cool the fruit down to 35°F., or slightly lower, prior to pulping, and then deærating the purée as soon as it comes from the pulping machine.—F. B. Davidson, *Aus. Food Manf.*, 1958, **28** (5), 20.

ORANGE JUICE

Effects of Oxygen

A quantitive study has been made of the changes in oxygen content, ascorbic acid content, flavour and colour during the processing and storage of pasteurised and frozen orange juices.

The juices were canned by means of a gas-saturation process which resulted in juices with an initial oxygen content ranging from about 3·5% to 0·002%.

The free oxygen in frozen juice stored at 0°F. caused a slow oxidative loss of ascorbic acid after 1 year. In pasteurised juices stores at 85°F., oxidative destruction of the ascorbic acid occurred only during the first few days as free oxygen rapidly disappeared from the can. Throughout subsequent storage anærobic loss of ascorbic acid continued at a rate of 1/10 of the early period.

Complete removal of oxygen in the cans of pasteurised juice failed to retard the development of stale flavour at 86°F. so it was concluded that the anærobic reactions also contributed to the development of stale flavour.—J. F. Kefford, H. A. McKenzie, and P. C. O. Thompson, *J. Sci. Food Agric.*, 1959, **10** (1), 51.

ONION PURÉES

Nature of the Colouring Matter

The development of a red colouration in purées prepared from inner scales of onion bulbs was investigated. The colour develops on acidification with acetic acid, and is not prevented by adding sodium chloride. Commercially dehydrated onion products, if the moisture content is adjusted to that of fresh tissue, do not redden at room temperature.

The reddening varies greatly between different varieties of onions, and between different batches of the same variety. It was found to occur only in mechanically bruised or finely cut tissues. The red colouring matter was found to be very unstable in solution. Generally, the rate and extent of reddening are increased by acidification, are affected by temperature, and are inhibited but not prevented by sodium chloride in concentrations of from 5% to 25%. It is not certain if oxidation is a factor in reddening.

The pigment was investigated by chromatographic methods, using *Magnesol*, a commercial anhydrous magnesium silicate, eluted by hot acidified methanol, for column chromatography. Paper chromatography was also used with pigment eluted from a silica gel column.

It was concluded that the colouring matter is a nitrogenous substance similar to, but probably not identical with, betanin, the pigment of red beetroots. Analysis of a sample, purified as much as possible, but known still to contian some colourless impurity, showed 53·0% carbon, 10·6% hydrogen, 3·6% nitrogen, 0·8% sulphur and 22·8% of methoxy group.—M. A. Joslyn and R. G. Peterson, *J. Agric. Food Chem.*, 1958, **6** (10), 754.

MIXING

Effects on Dough Properties

The flour used in this study was an unbleached, improver-free, straight-grade sample commercially milled from a blend of Canadian hard red spring wheat with a protein content of 12·6%.

Unleavened doughs were prepared with water and salt solution to give an absorption of 62·8% and a salt content of 1% (flour basis). The doughs were mixed for 1 to 20 min. Some were mixed in air and some in the equivalent quantity of nitrogen. For each mixing time different reaction times were given of 5 min., 2 and 4 hr.

At the end of a specified reaction time, the doughs were shaped on an *Extensograph*, clamped down and rested before stretching.

The results showed that the doughs mixed in oxygen and air decreased in their extensibility with increased mixing time. The data showed that the mixing had very little effect on the structural relaxation behaviour of the dough, but the effect of atmospheric oxygen occluded during mixing was pronounced. The effect of mixing *per se* appears to be distinct from and independent of the effect of the oxygen. It is suggested that mixing decreases the size of the flow unit in dough.—C. J. Dempster and I. Hlynka, *Cereal Chem.*, 1958, **35** (6), 483.

GLUTAMIC ACID

Fermentation Process

The manufacture of L-glutamic acid by a fermentation process is reported from Japan. The principal raw material is sweet potatoes, a culture broth of which, with sources of nitrogen and with inorganic materials, is fermented with a strain of *Micrococcus* which requires the presence of biotin. The organism produces alpha-ketoglutaric acid from saccharino materials and is very active in reducing and aminating the acid to alpha-amino-glutaric acid. The fermentation is aerobic, at a *p*H of 6-9. Biotin balances the growth of the micro-organism with the fermentation reaction. Yields of L-glutamic acid are as high as 37·5 mg. per c.c. Other than salts of glutamic acid, there are no major impurities formed in this, the "Kyowa" process.—*Ind. Eng. Chem.*, 1958, **50** (9, Part 2), 1343.

FLOUR BLEACHING

Fatty Acid Retention

It was previously shown that oxidative bleaching of flour by treatment with chlorine dioxide, potassium bromate, or atmosphere oxygen, does not cause any significant change in the content of essential fatty acids. Experiments were conducted using ammonium persulphate, benzoyl peroxide, and ascorbic acid, the last of which is believed to act through its conversion by an oxidation-reduction reaction to dehydro-ascorbic acid. The new reagents produced little destruction of fatty acids, except when benzoyl peroxide was used at a higher level of 333 p.p.m., when the formation of conjugated dienoic acids was noticeably increased.—N. Fisher (Mrs.), M. L. Ritchie, and J. B. M. Coppock, *Chem. and Ind.*, 1958, No. 42, 1361.

CEREALS

Influences on Dried Rice

Milled rice samples of 10 different varieties, three processed rices, and Century Patna variety dried at different temperatures were treated with water for 10-40 min. at 70-98°C. Determinations were then made of the water absorption of the treated grains, of the undissolved solids contents, and

of dissolved contents taken into the treating water.

High values in each of these properties were obtained with varieties which were cooked to a sticky condition, generally considered undesirable. Low values were obtained with the long grain varieties preferred for cooking and their kernel cohesiveness. These varieties had a high amylose content and yielded a firm, dry, and non-sticky product.

The differences in water absorption and solid content are related to kernel cohesiveness and other easily defined characteristics.—J. T. Hogan and R. W. Planck, *Cereal Chem.*, 1958, **35** (6), 469.

SPOILAGE CONTROL

Organic Acid Effects in Mango Pickle

The relative effects of acetic, citric, and lactic acids on the control of spoilage in mango pickle, due to moulds and yeasts, have been investigated.

Acetic acid was found not only to control spoilage at low concentrations but, it is stated, was found to be more effective than either citric or lactic acid. With unsalted pulp, a concentration of 0.36% stopped the growth of mould and yeast whereas 16% and 5.04% concentrations of citric and lactic acid respectively were required to stop the growth of organisms. If the salt concentrations in the pulp are increased then it is possible to prevent growth with relatively lower concentrations of these acids.

It was found that the inhibitory effect of these organic acids is not entirely due to the *p*H they impart to the medium, but is also due to the nature of the acid molecules and their anion part.—J. C. Anand and D. S. Johar, *J. Sci. Industr. Res.*, 1958, **17** (12), 203.

TORTILLAS

Losses in Preparation

Tortillas constitute an important article of diet in Central America. They are made by adding one part of whole corn to two parts of approximately 1% aqueous solution of lime. The mixture is heated to 80°C. for 20-45 minutes and allowed to stand overnight. The cooking liquor is decanted and the corn, called "nixmatal" at this stage, is washed two or three times with water, without removing the episperm or the germ. It is ground to a fine dough ("masa"). About 50 g. of the dough are patted flat and cooked on both sides on a hot iron plate. This process may vary somewhat.

The preparation of tortillas causes heavy losses of the thiamine, riboflavin, and niacin from the corn, and also of carotene from yellow corn. Losses are believed to be from both physical and chemical causes.—R. Bressani, R. Paz Y Paz, and N. S. Scrimshaw, *J. Agric. Food Chem.*, 1958, **6** (10), 770.

Effect of Lime Treatment

Rats and pigs fed on tortillas thrive more than when fed on raw corn. They also grow better when fed on corn treated with alkali. It is suggested that this phenomenon is due to the decreased solubility of zein brought about by the treatment with lime and heat, and also to an increased rate of release of most of the essential amino-acids.

Samples of corn and tortillas were analysed for 18 amino-acids. No important differences were found. The average amino-acid content of corn and tortillas, expressed on the basis of grams of amino-acid per g. of nitrogen is shown in a table, from which the average changes were calculated. The losses of essential amino-acids were 21.0% for leucine, 18.7% for arginine, 12.5% for cystine, 11.7% for histidine, and 5.3% for lysine. Of the non-essential amino-acids, the losses were 8.7% of proline, 7.1% of serine, and 6.3% of glutamic acid.—R. Bressani and N. S. Scrimshaw, *J. Agric. Food Chem.*, 1958, **6** (10), 774.

ANTIOXIDANTS

Uses in Foodstuffs

The author surveys comprehensively the nature of antioxidants, methods of testing them, methods of application, and their effectiveness in foods of various types. Antioxidants are of two main types, the primary ones and the synergists or "metal deactivators." Substances of the second group increase the activity of the primary antioxidants or inhibit the catalytic oxidising action of metallic trace elements.

All primary antioxidants permitted to be used in human foods are phenolic substances, either polyphenols or ortho- and para-substituted monophenols. Well known members of the group are 2-tertiary-butyl-4-methoxyphenol (BHA), 2,6-di-tertiary-butyl-4-methyl-phenol (BHT), and propyl gallate. Aromatic amines, used as industrial antioxidants, are not permitted additives owing to doubts concerning their toxicity.

Among the synergists are citric acid, ascorbic acid, some other hydroxy acids, phosphoric acid, acid phosphates and polyphosphates, and certain phospho-lipoids. If a fat contains more than traces of an active metal, the presence of both a primary antioxidant and a synergist is necessary.

Ascorbic acid is generally a valuable antioxidant, but cannot be used in the presence of traces of copper, which catalytically oxidises ascorbic acid to a compound which acts as an additional catalyst for oxidation.

Many antioxidants of both groups have very limited solubility in fats. To incorporate them, it is therefore common practice to dissolve them in a fat-miscible non-toxic solvent such as propylene glycol, monoglycerides, or lecithin, or to use them in the form of emulsions in water. In the latter case, direct addition to foods is effected by spraying or other means.—C. H. Lea, *J. Sci. Food and Agric.*, 1958, **9** (10), 621.

Writing a book?

The Leonard Hill Technical Group, publishers of FOOD MANUFACTURE invite the submission of manuscripts of books to be considered for publication. All manuscripts will be promptly acknowledged and carefully considered by qualified experts. A synopsis with chapter headings should be sent in the first instance to:

The Manager,
Leonard Hill (Books) Ltd.,
Leonard Hill House,
Eden Street,
London, N.W.1.

Leonard Hill are specialists in industrial, technical and scientific books. They have a reputation for vigorous and successful promotion of their books by extensive advertising and maintain a world-wide selling and distributing organisation.

Improving Nutritive Value

(*Concluded from page 124*)

311. E. Lauschner. Werksarzt und Gro-SSverpflegung. Erfahrungen auf entlegenen Grosshauplätzen im Hochgebirge. *Helv. Med. Acta*, 1956, **23**, 240.

312. W. Gabel. Vitaminierung nicht nur bei diätetischen Lebensmitteln. *Dt. Lebm. Rdsch.*, 1952, **48**, 250.

313. W. Wodsak. Die rechtlichen Grundlagen für die Vitaminierung von Lebensmitteln. *Dt. Lebm. Rdsch.*, 1953, **49**, 77.

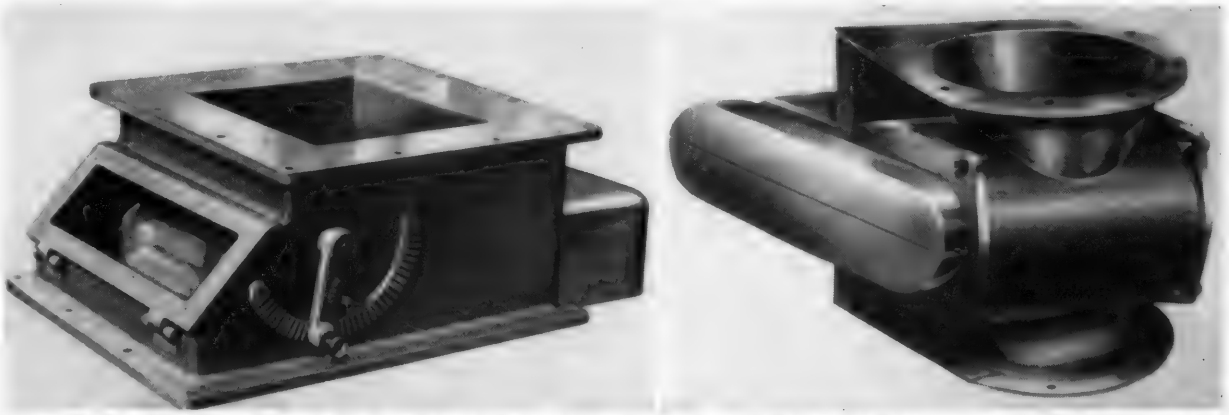
314. Stellungnahme des Arbeitskreises Berlin in der GDCh-Fachgruppe Lebensmittelchemie zum Problem der Vitaminierung von Lebensmitteln vom Februar, 1953. *Dt. Lebm. Rdsch.*, 1953, **49**, 108.

315. H. Cohen, A. C. Chibnall, J. H. Gaddum, R. A. Morton and L. J. Witts. Report of the Panel on Composition and Nutritive Value of Flour. London, Her Majesty's Stationery Office, 1956.

316. Verfügung des Eidgenössichen Departmentes des Inneren über Zusatz und Anpreisung von Vitaminen bei Lebensmitteln. Bern, 1957.

317. Council on Foods and Nutrition. A statement of general policy concerning the addition of specific nutrients to foods. *J. Am. Med. Assoc.*, 1954, **154**, 145.

Machinery and Equipment



(*Left*) **The Lea-Bar Vibra Feeder for feeding dry material to grinding, pulverising or mixing plant, made by W. S. Barron and Sons, Ltd. (*Right*) The Mikro Airlock made by Pulverising Machinery, Ltd., feeds materials through a pressure change while maintaining a gas seal.**

VIBRATORY FEEDER

A feeder, the *Lea-Bar Vibra Feeder*, designed for feeding dry material to grinding, pulverising, or mixing plant has been introduced by W. S. Barron and Son, Ltd.

The vibration of the feeder is effected by an electro magnet with variable amplitude control, powered by a single-phase alternating current of 240 volts. In most cases, the units are supplied with suitable controllers for connecting direct to a 50-cycle supply, a rheostat being incorporated which gives control up to the maximum capacity of the machine.

In action, the vibrator pulls the tray back sharply at each pulsation of the current, the tray returning to its position at a slightly lower rate by means of leaf and coil springs. The cycle is repeated at high speed, causing the material to flow forward with an infinite variation in the rate possible.

The capacity of the material ranges from zero to many tons, according to the material being handled.

ROTARY AIR-LOCK VALVE

The difficulty of mechanically feeding materials through a pressure differential and at the same time preventing air or gas from being fed with such materials has been overcome, it is claimed, by the improved *Mikro Airlock*—a rotary air-lock valve assembly now being manufactured in this country by Pulverising Machinery, Ltd.

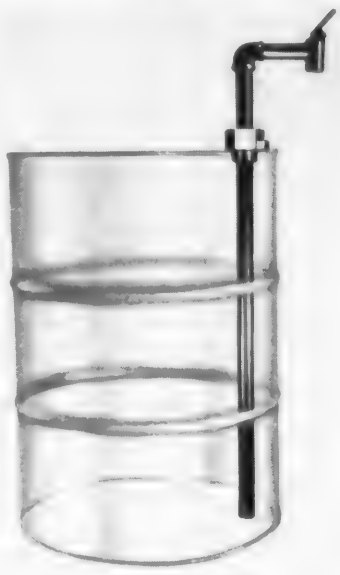
Fundamentally, the Mikro Airlock consists of a fabricated cylindrical housing inside which rotary-vanes slowly revolve, conveying material from an upper chamber and dropping it by gravity into a lower receptacle—such as a barrel, drum, case, or any other discharge container.

The rotary vanes are usually tipped with flexible plastic materials to provide a seal between these tips and the inside walls of the housing. The vanes are available in various compositions to meet particular requirements.

A packing gland at each end of the driving shaft is said to stop the leakage of dust when the valve is under pressure, or seepage of air or gas when the unit is under suction.

Both motor and drive, which can be of the belt, chain, direct coupled, or variable speed type, are located on the same side of the unit so that the rotor may be easily removed for the replacement of vane tips.

The standard sizes available are 5 in., 8 in., 12 in., 18 in., and 24 in. diameters, giving a complete output coverage from 10 to 6,500 cu. ft. per hr.



The Suba model 108 air operated barrel dispenser can be supplied in stainless steel or other materials and delivers liquids at up to 15 g.p.m.

BARREL DISPENSER

A new air operated fully automatic barrel dispenser, *Suba Model 108*, will deliver liquids without fluctuation or pulsing at the rate of 15 gal. per min., dependent on the type of the vessel and the viscosity of the liquid. Other than the delivery valve, which is manually opened and closed, there are no moving parts, and thus deterioration through wear is negligible. All that is required when changing from one liquid to another is one simple flush.

The dispenser consists of a solid drawn steel tube riser pipe with aluminium valve body, air regulator body, and barrel adaptor. The valves, stems, and air regulator piston are brass, and the delivery valve is designed to give minimum drip after serving. The barrel adaptor on the standard model fits 2 in. B.S.P. thread; the air regulator has a ¼ in. B.S.P. female thread. The air control valve ensures that the storage vessel (40 gal. drum, etc.) is not subjected to more than 5 p.s.i. pressure. In addition, an excess pressure safety valve is fitted to relieve excess air pressure in the event of the air control valve not functioning.

The instrument can be manufactured in stainless steel or other suitable materials, and costs £7 10s. *ex* works. Makers are Suba Hydraulics.

COCOA NIB ROASTING MACHINE

New gas-fired plant to roast an estimated 1,000 lb. to 1,500 lb. of cocoa nibs per hr. has recently been installed in the premises of a firm in the south of England with the help of the North Thames Gas Board.

The direct air heater is fired by three *Hypact* burners having a combined maximum gas rate of about 2,500 cu. ft./hr. at normal mains pressure with the combustion chamber maintained under a slight vacuum of approximately ¼ in. w.g. by a fan capable of handling 3,500 cfm. of air at 225°C.

The temperature of the air entering the roaster is 225°C. nominal, but the control system enables this to be varied between 150°C. and 300°C. if necessary, although this normally only applies during starting up and shutting down. The ultimate temperature of the roasted nibs is 140°C. An automatic controller measures the exhaust temperature and modulates the inlet temperature to the roaster through a spring-loaded air pressure operated valve working in conjunction with an independent manually operated by-pass.

Initial lighting is provided by a spark ignition system, and the plant is safeguarded against flame failure by a photoelectric cell linked through the control panel on to solenoid-operated valves on the main and pilot gas lines.

All the many electric motors driving various pieces of equipment are interconnected for sequence, starting from the control panel, and it is claimed that the installation is foolproof and safe.

The ancillary automatic weighing equipment and control panel, together with an impregnator of their own design, was supplied by Dunford and Elliott Process Engineering, Ltd.

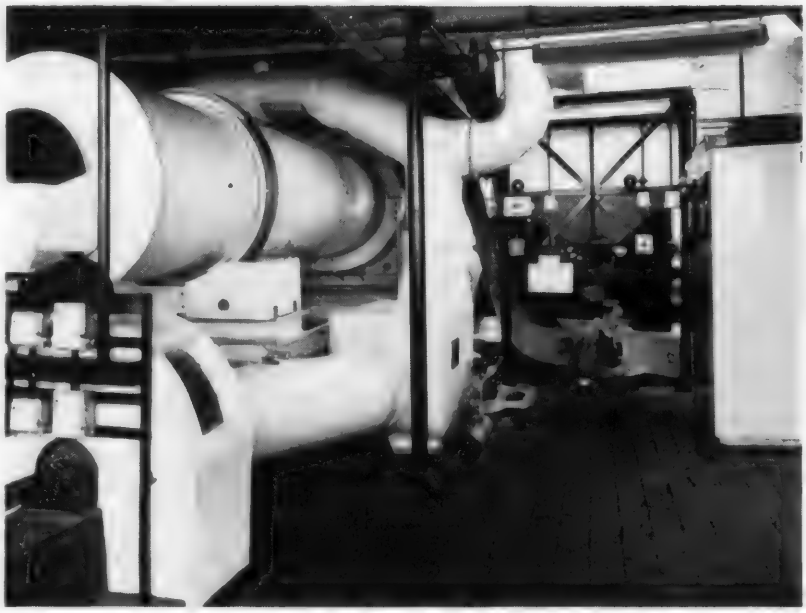
LABELLING MACHINE

A larger version of the Newman bench-type automatic labelling machine for cylindrical objects, *Model 4B*, has been announced by D. Trapow and Co., Ltd. This machine will accommodate items for labelling up to 2¼ in. diameter with labels up to 7 in. wide.

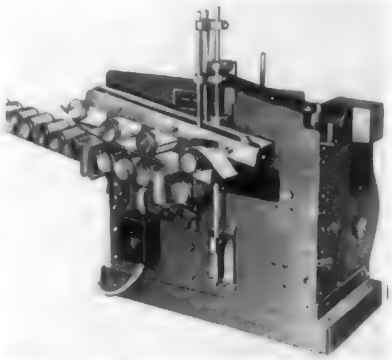
It is claimed that the machine will label almost any cylindrical object from a 6-oz. aerosol can down to the smallest glass ampoules with equal efficiency.

The labels may be long enough to overlap, or if required, shorter labels may be used, providing the label covers more than half the circumference of the object to be labelled.

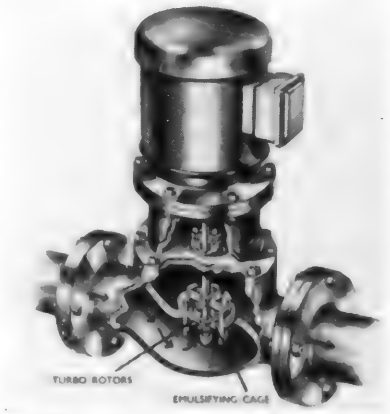
Ramp feeding is used for the objects. Outputs of up to 200 doz. per hr. are obtainable.



A cocoa nib roasting plant supplied by the North Thames Gas Board, showing the burner equipment and control panel.



The Newman automatic labelling machine model 4B made by D. Trapow and Co., Ltd., will take cylindrical packs up to 2¼ in. diameter.



The Thrumix continuous pipeline mixer made by William Boulton, Ltd., showing turbo rotors, emulsifying cage and stuffing box.

CONTINUOUS PIPE LINE MIXER

A new unit, which mixes fluids as they flow through a pipe-line, dispensing with the need for large agitating vessels, has been developed by Wm. Boulton, Ltd.

The mixer is known as the *Thrumix* continuous pipe-line mixer. It is manufactured in a range of sizes from 1 in. up to 6 in. bore and can be made in cast iron, stainless steel, or the usual constructional metals.

The makers say that the straight-through design enables the mixer to be inserted in a pipe-line without the need for the introduction of bends or tees to accommodate the unit.

The principle employed is a very high degree shear and an easily obtained controllable degree of recirculation. Small horse-power motors are all that are required in the unit, ranging from ½-2 h.p., depending on the requirements.

Either a standard stuffing-box or mechanical seal is fitted, as required. On low viscosity materials the throughput is approximately 14 gal. per min., increasing to a maximum of 400 gal. per min.

Anything that can be pumped will pass through the mixer, and it is said to be ideal for use in continuous processes where an agitated tank is at a disadvantage.

Two models are being produced; the first model with a fixed degree of recirculation, and the second model with means for axial movement of the stator cage, which allows varying degrees of recirculation and controlled shear. This allows different degrees of mixing and blending, depending upon materials being mixed.

The Wrigley model no. E.73 electric tug is powered by an Exide Ironclad 30 v. 166 amp. hr. battery and has a 2·3 h.p. motor provided with inching as well as speed control.

ELECTRIC TUG

An electric tug which can pull a load of 4 tons has been developed by Wessex Industries (Poole), Ltd.

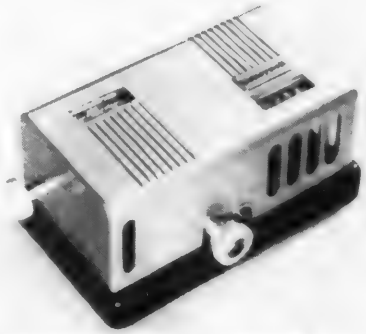
Known as the *Wrigley model No. E.73*, the tug has an S.E.M. motor developing 2·3 h.p. at 1,500 r.p.m. and a primary chain drive to reduction gear with an adjustable jockey sprocket for tension and a secondary chain to the front-wheel drive. Steering is by handlebar on the power unit assembly or by geared steering wheel control. The control gear is electrical and an accelerator pedal operates a five-step speed controller which, together with an electric magnetic contactor and heavy duty resistance, is claimed to give smooth starting, inching, and speed control. The chassis is of fabricated steel channel and a towing bracket and pin is mounted on the back of the tractor.

The tug is powered by an Exide *Ironclad* 30 v., 166 amp. hr. capacity traction battery. Larger capacities of battery are available.

THERMOSTAT

A new thermostat said to solve a ventilating problem for factories and other large areas which use unit heaters and forced air convectors for basic heating is being made by Honeywell Controls, Ltd. An additional control can take over in hot weather to operate the fans when the heating plant is shut down.

A unit heater installation can now be controlled entirely from the thermostat, enabling the operator to run the equipment automatically as with a conventional thermostat, or continuously regardless of temperature factors. It also allows him to stop the fans completely when the space will be unoccupied for considerable periods.



A thermostat made by Honeywell Controls, Ltd., for monitoring factory heating systems.

The new features of the thermostat are based on a three position manual control with a locking device which prevents it being altered by unauthorised persons. The three positions are: automatic, which brings the conventional function of the thermostat into operation; on, which allows the fans of unit heaters to turn even when the thermostat is not calling for heat; and the off position, which shuts the plant down completely. This new thermostat and a purely automatic thermostat also with a loading of 4 kw. is available with or without a built-in thermometer. Both the thermostats are intended for use with low voltage or line equipment.

NEW HYSTER TRUCKS

A new series of 6,000, 7,000 and 8,000 lb. capacity lift trucks has been released by Hyster, Co. These trucks are part of the *Challenger* line of pneumatic-tyre trucks made by this firm.

The Challenger 70 and 80 are said to be the only pneumatic-tyre trucks on single drive wheels in these weight capacities. The narrow width of single drive wheel design, plus short turning radius and power steering, makes it possible to use these lift trucks in standard, single-door rail van. Dual wheels are optional on all three models.

These new trucks are powered with six cylinder, 70 h.p. Continental engines that develop 168 pound-feet of torque at 1,200 r.p.m. Large reserve power of this heavy-duty engine gives these trucks the fastest lifting speed in the industry—up to 66 ft. per min. Operating speeds (up to 17 miles per hr.) are the fastest in this class of truck according to the makers.

MATERIAL FEEDER

A new hopper-type of material-feeder, of 2 cu. ft. capacity, is now being manufactured in this country by Pulverising Machinery, Ltd. Called the *Mikro-Feeder*, it has been designed to give an accurate, constant, and uniform flow feeding of any wet or dry substances, other than those which are viscous or semi-viscous.

The feeder can be used as a feed-unit for a ball mill or pulveriser, for a dryer or mixer, and for any purpose which requires a continuous feed.

The machine consists of a vertical rotating-shaft on which is mounted a circular feed-plate and a 15 in. diameter steel hopper, 21 in. high. Both plate and hopper rotate as one complete assembly.

The rotating-shaft, feed-plate, and hopper are mounted on a steel housing over the drive motor and reducer-gear. Secured to this housing is a shearing-knife, which slides between the base of the hopper and feed-plate When the feeder is in action, the hopper, filled with material, revolves, and the shearing-knife at its base shears off just enough of the substance to maintain a chosen feed-rate. The rate of feed may be varied from a few pounds to 500 lb. per hr., according to the material being fed.

FILTER PRESS AGENTS

Durham Raw Materials, Ltd., have been appointed sole selling agents in U.K. for the full range of filter presses manufactured by F. H. Schule, Ltd., of Hamburg. Schule filter presses can be supplied to standard patterns, or tailor made, to cover any industrial filtration application.

Schule filter presses are of two basic types: flush plate and frame presses, for use where the filter cake is of uniform thickness and porosity, and facilitates an effective flushing of the solids; and recessed plate presses, for use where solids are subject to blockage. Both these types of press are available with plate sizes from 9¾ in. to 57 in.

News Digest

Ice cream labelling

In reply to a question in the House of Commons, Mr. John Hare, Minister of Agriculture, Fisheries, and Food, said that the Secretary for Scotland, the Minister of Health, and he had decided that ice cream containing a vegetable or other non-dairy fat should be marked on the label or container with the words "Made with vegetable fat" or "Made with non-dairy fat."

He hoped to lay regulations before the House before the end of February. His revised proposals were at the moment being circulated for comment by interested organisations.

The Minister was also asked if he would, in framing these regulations, take account of the amount of ice cream eaten by children and insist on a minimum vitamin content in the fat used, as with margarine. He said that he would look into it.

A spokesman of the ice cream manufacturers said that they are already subject to control in that the ingredients of ice cream are controlled by existing regulations. The manufacturers have suggested that they should be allowed to include other ingredients in the addition to the proposed marking.

It is estimated that about 90% of the ice cream manufactured in Britain is made with vegetable fat.

A spokesman of the Ice Cream Alliance said that they could not believe the public would stop buying overnight a product they had grown to like in the past 14 years because it will in future be marked with a vegetable fat label.

The National Farmers' Union welcomed the announcement, but still think that the term "ice cream" should be confined to the proper dairy product.

Gloucester ice cream factory

T. Wall and Sons (Ice Cream), Ltd., have just completed plans for erecting their new ice cream factory in Gloucester. Work on it will begin soon, and it is anticipated that it will be in production in 1960.

On the site, which covers nearly 30 acres, a number of ancillary buildings will be erected beside the main factory. The latter will consist of a ground floor where the ice cream ingredients will be kept under ideal conditions, with the mixing tanks, compressers, and locker rooms housed on the same floor, and a top floor which will house the gleaming stainless steel production lines where as many as ten different types of ice cream can be produced simultaneously under perfect hygienic conditions. Production can be at the rate of about 45,000 gal. of ice cream per shift.

Adjacent to the main plant there will be a cold store where the newly made ice cream will be stored for a short while prior to being despatched to the various depots in the north, north-east, and west of England, for general distribution. On the same site there will also be a distribution depot to cover the Gloucester area. A wafer factory is also to be built and is expected to start production before the end of the year. The important buildings will be the repair shop, where all refrigerators belonging to the company will be overhauled and maintained, and the transport workshop, where maintenance, body building, painting, and overhauls can be carried out on the fleet of vehicles operated by Wall's in this part of the country.

Whilst the factory will be as fully automatic as is consistent with efficient operation, there will be work for nearly 650 people, rising to 1,000 in the summer.

Two views of the recently completed animal feed factory of J. Bibby and Sons. The factory, which is situated on the bank of the Thames at Wandsworth, London, is on a 1½ acre site and cost £1½ million. Production is running at 1,500 tons per week, and it is expected by the end of the year that the plant will be capable of producing 2,500 tons of feedingstuffs per week. The plant will serve the south-eastern part of the country below a line running from Cambridge to Southampton.

Sales office

The sales of Sherpa handling equipment are to be made direct from the head office: Salisbury Precision Engineering, Ltd., Castle Road, Salisbury, Wilts. Tel.: 4291.

A showroom is being retained at: 1, Buckingham Palace Mansions, Buckingham Palace Road, London, S.W.1.

Crop Protection and Pest Control Exhibition—1959

Leonard Hill, Ltd., announce that the next International Crop Protection and Pest Control Exhibition, organised by "World Crops," will be held from Wednesday, December 9, to Friday, December 11, 1959, at the Seymour Hall, St. Marylebone, London, W.1.

This date has been chosen in response to many requests that the exhibition should be held in the winter. In fact, this year's exhibition will coincide with the Smithfield Show, when thousands of farmers will be in London.

The aim of the exhibition is to cover all aspects of crop protection and pest control, including:

Insecticides; pesticides; tree bands; fumigants; rodenticides; herbicides and weedkillers; fungicides; sprayers and applicators of all kinds; cloches; seed treatments; traps; slug killers; insect repellants; bird repellants; timber preservatives and treatments; protective fencing; bird netting; disinfectants; aerial spraying and other protective services.

Further details can be obtained from the Exhibition Organiser, "World Crops," Leonard Hill House, Eden Street, London, N.W.1.

New plant emphasises purity

The Press was recently invited by Williams (Hounslow), Ltd., to inspect their new plant at Hounslow for the manufacture of food colours. Costing in the region of £250,000, the plant is designed for rapid batchwise production of very high purity azo-dyes. Chief features are the elaborate precautions to avoid at all stages contamination by dirt, metals, and by unwanted subsidiary products. Apart from some items in high-grade stainless steel, all contact surfaces are non-metallic; reaction vessels are rubber lined, and extensive use is made of P.V.C. pipework and glass-fibre-reinforced polyester resins for ducts and inspection covers. All process water is demineralised automatically, and automatic control of effluent *p*H is also arranged. An ice-making plant produces continuously powdered ice for reaction cooling. The plant has been designed for easy maintenance and quick washing through to enable rapid changes from one dye to another to be made, and is operated by no more than six men.

Self-sanitising surfaces

Cleanliness in hospitals has received much publicity following the publication of the report by Lord Cohen of Birkenhead's committee of the Standing Medical Advisory Council to the Central Health Services Council, and although this deals specifically with staphylococcal infection in hospitals, it does show that bacteria and fungi can lodge on any objects surrounding men and animals and become dangerous sources of cross-infection. Although food factories do not have to deal with cross-infections from staphylococci, utter cleanliness must nevertheless be observed to prevent contamination of food; Denton Edwards Paints, Ltd., point out that their *Dentolite* process has been developed specifically for the food and allied industries. The makers claim that these self-sanitising paints create a surface which, during the whole life of the paint film, suppresses the growth of moulds and fungi, is completely non-poisonous, and is permanently antibacterial.

Tube firm's Silver Jubilee

Universal Metal Products, Ltd., was formed in 1934 by Mr. E. G. Wertheimer for the manufacture of tin and lead collapsible tubes, and commenced production with a few machines and a handful of employees. The company, which is a wholly owned subsidiary of the Winterbottom Book Cloth Co., Ltd., is celebrating its Silver Jubilee this year.

Today the company employs approximately 1,200 people and it is claimed that it is the biggest single tube production unit in the Commonwealth, specialising in the production of soft metal tubes, aluminium tubes, and rigid containers.

The origin of the extensive plastics division was the demand for plastic tube caps. Today, their mouldings are to be found in many homes, in the form of components in washing machines, refrigerators, suction cleaners, and other domestic appliances, and they are also used extensively in industrial equipment.

The firm provide a free service in connection with customers' new products whereby recommendations as to the most suitable packages are made. Latest developments include plant for aerosol and pressure packaging, *Monoblock* containers, plastic bottles, and plastic tubes.

Instrument laboratory

Construction has commenced of the new research laboratory for the Cambridge Instrument Co. Overlooking the River Cam and Jesus Green, and within 10 min. walk of the centre of Cambridge, the 20,000 sq. ft. building will provide an imposing frontage for the Cambridge factory.

The top floor with roof lighting will form an ideal design and drawing office, and the three floors below are being fitted with the latest equipment for instrument work involving physics, chemistry, electronics, and precision mechanical engineering. The new building is said to herald a considerable expansion in research, development, and design for which staff are currently being recruited.

The architects are Edward D. Mills and Partners, designers of the British Industries Pavilion at the Brussels Universal and International Exhibition, 1958, and J. Jarvis and Co., the main contractors, and the new laboratory is scheduled for completion in June next.

Packaging Exhibition

The sixth Packaging Exhibition will be held at Olympia, London, from September 8-18, 1959. It will occupy nearly 300,000 sq. ft. of space, and will completely fill both the Grand and National Halls of Olympia. Three hundred exhibitors have booked stands covering a wide range of machinery and equipment.

The international character and importance will be quite pronounced as twelve overseas countries will be represented with the exhibits of approximately 30 foreign machinery manufacturers.

U.S. stockists

Q.V.F., Ltd., have appointed the Corning Glassworks, of Corning, New York State, as stockists and distributors for the whole of the U.S.A. They had already shipped to America £10,000 worth of *Q.V.F.* industrial glassware as part of an initial order.

OBITER DICTA

● Non-violence is good for vegetarians. We are meat-eaters.—*African student speaking to Mr. Nehru.*

● The French could almost eat in blinkers when they are dining out—they concentrate so much on the plate.—*Daily Telegraph.*

● Police are not just solid plum puddings—they have some sense about them you know.—*Judge John Maude at Old Bailey.*

● In your last Budget you took two bob off Port wine, let me add that we are Oliver Twists to a man.—*Senhor Augusto Potier, Portuguese Minister and Chargé d'Affaires.*

● Moses forbids Jews to eat milk products with a meat meal, and I have always felt that he did not lay down health regulations without cause.—*Letter in Daily Telegraph.*

● The glass cricket stump is dimensionally correct in every respect, is hollow and holds about a pint. Its customary contents will be beer and it will be used as a variation of the well-known yards of ale.—*Press Release.*

● Mrs. Smith may buy some rather strong cheese. Does she want to put it in her shopping basket with other fine foodstuffs and risk affecting them? Not likely. A voice comes from behind the counter: "One moment, Madam, I'll just seal it up for you."—*Press Release.*

● Perhaps Britain may see her best cooks united under the sign of the turning spit. Then perhaps we shall see that worst of misnomers, the "barbecue," banished from our misguided caterers' establishments who are too fanciful to make use of a good English word.—*Daily Telegraph.*

● As a "home executive" (instead of a housewife), I process edible matter with heat exchangers and a combustion chamber, decontaminate ceramic ware with a detergent solution and renovate apparel. But I find it just as tiring as cooking, washing-up and darning.—*Letter in Evening News.*

● A food firm from Oregon with the name of Kubla Khan Food Products has a flourishing new export market for its frozen, packaged chop suey, chow mein, and other Chinese dishes—the Orient. "The food seems to have caught on over there," says a Kubla Khan executive.—*Daily Express.*

PEOPLE

Mr. C. L. Ferns

Miss L. E. Sargent

Mr. F. L. Fitter

Mr. C. L. Ferns, for 17 years factory director at Trufood's Creameries at Wrenbury, Cheshire, recently retired after 34 years' service with the company. To mark the occasion a luncheon was given in his honour in Nantwich at which he was presented with a clock.

Originally Mr. Ferns intended to become a farmer and studied at Holmes Agricultural College. His career was interrupted in 1914 by the war and, after service in the army, he studied scientific and pfactical agriculture at Manchester University. Finding that farming during the post-war slump offered few prospects, Mr. Ferns decided to make use of his knowledge of milk and joined Glaxo, Ltd., moving to Trufood, Ltd., in 1923. After only three years with the company he rose to be sales manager.

In 1930, he became factory manager, and in 1941 was made a director.

Mr. Ferns has been succeeded as factory director by Mr. Walter White.

■

C. M. W. Thomas, A.M.I.E.E., has joined the board of Klaxon, Ltd., as commercial director, and A. C. Risbridger, A.M.I.MECH.E., has been appointed general manager.

■

Mr. T. S. T. Tregellas has joined the Pig Industry Development Authority as a public relations officer after 13 years with the War Office. He will work from PIDA House, Ridgmount Street, London, W.C.1. Tel.: Langham 9174.

■

Mr. Michael J. Smedley has been appointed to take charge of market research and sales development at Smedley's Ltd. He is the eldest son of the chairman, Mr. Wallace V. Smedley, and has been with the family firm for 12 years in the production, personnel, and sales departments.

■

Mr. George William Riley, M.I.CHEM.E., has retired from the boards of George Scott and Son (London), Ltd., and Ernest Scott and Co., Ltd. He will, however, continue to serve the companies as technical consultant. He retires in his sixtieth year of continuous service with both companies.

■

Mr. F. L. Fitter, who has worked for Brand and Co., Ltd., for 54 years, has resigned his directorship upon reaching the age of 70. Joining the company in 1905 as an office junior, he worked his way through various departments and laboratories.. After serving in World War I he was appointed factory manager, a post he held for 25 years.

In 1947 he was made a director.

Miss L. E. Sargent has been appointed sales representative for the Greater London area by Betts and Co., Ltd. The appointment of a woman to such a post is believed to be an entirely new departure in the packaging trade. Miss Sargent, who joined Betts and Co., Ltd., on January 1, 1959, was buyer for Coty (England), Ltd., for 13 years, and from 1946 to 1954 she was buyer for Elizabeth Arden, Ltd.

■

Mr. F. S. White has joined the London sales team of Brian, Jenks and Co., Ltd. He will cover parts of north-west London and Beds., Herts., Bucks., Cambs., and Hunts.

■

Mr. G. S. Pryor has been elected chairman and Mr. W. J. Miles vice-chairman of the Tea Trade Commission. Mr. Pryor is a director of Pryor and Tindall and Mr. Miles is a director of Appleton, Machin, and Smiles.

■

Mr. H. J. Browning, a director of the National Canning Co., Ltd., and sales director of Smedley's, Ltd., has joined the board of Jersey Canning Co. He has been connected with the food trade all his life, joining Smedley's in June, 1946. He was appointed to the board of National Canning and made sales director of the Smedley group of companies in 1952.

■

The council of the National Farmers' Union unanimously elected Sir James Turner as president for 1959. This will be Sir James's fifteenth consecutive year of office.

The council also elected Col. H. J. Wilson, O.B.E., T.D., as deputy president, and Mr. J. Rhys Thomas as vice-president.

■

Mr. Roger N. Jukes has been appointed product design manager of Quickfit and Quartz, Ltd. He has been with the firm for nearly 12 years on the staff of the development director.

Mr. Jukes will also be responsible for technical service and the preparation, from the technical aspect, of literature and instruction leaflets.

Mr. R. A. J. Lander has been appointed as a technical representative by Viskase, Ltd. He will work with Mr. John Rankin in Scotland.

■

During H.M. Queen Elizabeth the Queen Mother's year of office as president of the British Dairy Farmer's Association, the council has elected Earl De La Warr, P.C., G.B.E., J.P., as deputy president of the association. Lord De La Warr was president of the association in 1958.

■

Mr. J. E. Chapman, assistant secretary to the Cocoa, Chocolate, and Confectionery Alliance, becomes secretary on April 1. Mr. D. M. Lacy becomes deputy secretary.

The present secretary, Mr. D. H. Joss, is leaving to become group administrative secretary with Booker Bros., McConnell, and Co., Ltd.

■

Mr. G. H. Sugden, Mr. C. H. Woolf, Mr. E. G. Liebert, and Mr. J. R. Rowlands have been appointed directors of Henry Simon (Holdings), Ltd.

Mr. C. G. Ahlquist and Mr. C. W. Jones have been appointed directors of Henry Simon, Ltd.

Mr. P. W. R. Jolley and Mr. L. Haines have been appointed directors of Simon Handling Engineers, Ltd.

Mr. F. B. M. Austin has been appointed managing director of Henry Simon (Australia), Ltd., with effect from March 1, 1959, in succession to Mr. K. R. Brocklehurst, who will remain chairman of the company.

Obituary

The death occurred in London on January 30 of Mr. Victor Joseph, an executive of J. Lyons and Co., Ltd., and a former president of the National Association of Master Bakers. He was 72.

Mr. Joseph started work at the age of 16 in the bakery side of J. Lyons and Co.

He was elected president of the association in 1948 and retained a seat on the council of the association right up to his death.

Food machinery agreement

The food machinery division of Mitchell Engineering Ltd., Peterborough, have announced an agreement with Chisholm-Ryder Co., Inc., of Niagara Falls, New York, U.S.A., whereby there will manufacture and market in the United Kingdom on an exclusive basis all the food processing equipment made by Chisholm-Ryder. This range of equipment includes their bean picker, rotary bean snipper, and the *Chisholm-Ryder New Way* high-speed caser and case sealer.

A reciprocal agreement will give Chisholm-Ryder Co., Inc., the selling rights in the U.S.A. and possessions for the Mitchell *Hydron* hydrostatic continuous steriliser. Chisholm-Ryder Co., Inc., will also be manufacturing and selling the other products of Mitchell's food machinery division.

Mill reconstruction

The Regent Flour Mills of the Scottish Co-operative Wholesale Society at Glasgow are in the final phase of a major reconstruction, and the scheme is being carried out with the mills running on fairly normal outputs. It is believed that usually such mill reconstructions sustain stoppage periods of six months up to one year because the nature of this type of overhaul usually involves every machine in the mill.

Flour milling has been carried on for nearly 400 yr. on the spot on which the Regent mills stand, and history says that following the battle of Langside in 1568, the Regent Moray granted the site to the Incorporation of Bakers of Glasgow.

Tradition has it that the Glasgow bakers supplied the forces of the Regent with bread during the time they were encamped in the vicinity, and after the battle the bakers made representations to the Regent regarding the high cost of getting their wheat ground, and he offered them a grant of land on which to build their mill.

As far as the records go the mill started work about 1570, and it was called the Bunhouse Mill from an old bun and ale house which stood nearby. For three and a half centuries the milling business was continued, and it was not until 1884 that it ceased to be a trading incorporation. The mill was destroyed by fire in 1886, and the site was disposed of to the late Mr. Ure, who erected the present building in 1890, and in 1903 the mill was acquired by the Co-operative Society.

"Pickles and Sauces"—a correction

In the Annual Review "Pickles and Sauces" (FOOD MANUFACTURE, January, 1959, p. 13), the last line of the first paragraph should read: "These tanks were often of galvanised iron as there was no chance of zinc coming in contact with the sauce."

One of the super-freeze access doors of the cold store built recently for the Union Cold Storage Co.

Glycerine, Ltd., have increased the price of their refined glycerine by £20 per ton.

Starch convention

The annual International Starch Convention, organised by the German Cereal Research Station at Detmold, will take place from April 21-23, 1959.

A special conference to celebrate 75 years of potato research will be held on April 24, and also on April 24 and 25 the first plenary session of the newly formed international committee for the standardisation of analysis of starch and its by-products will take place.

Correspondence

SIR,

May I comment on your annotation about victualling space ships? [*Editorial Comment, Feb., 1959.*] As I pointed out in "Penguin Science News" (Aug., 1958, **49**, 28) astronauts must remember the inverse square law. As a glance at the night sky will demonstrate, space is a pretty dark place. At the distance of Mars sunlight is only one-third as strong as here; that would just be enough to run an interplanetary allotment. By Saturn it's only one-hundredth and very little would grow. So anyone who thinks of venturing more than 50 or so million miles from home won't be able to live very amply on the local energy flux.

Yours, etc.,

N. W. PIRIE,

Head of Biochemistry Department,
Rothamsted Experimental Station.

Erections and Extensions

Cavaghan and Gray, Ltd., have plans in hand for the erection of extensions to their bacon factory at Harraby, Carlisle.

▪

T. Sugden and Sons, Ltd., corn millers, Brighouse Mills, Brighouse, Yorks, are having a grain silo erected at their premises.

▪

Co-operative Wholesale Society, Ltd., are having a soft drinks distribution depot and warehouse erected in Maxwell Street, South Shields.

▪

William Milne, Ltd., ice manufacturers, are having an additional floor constructed at their factory in Old Wynd, Glasgow, C.1, Scotland.

▪

The Danish Bacon Co., Ltd., are having extensions built at their depot in Lockfield Avenue, Brimsdown, Enfield, Middx.

▪

M'Nab Distilleries have had plans approved for the erection of two warehouses on a site at Northesk Road, Montrose, Scotland, at an estimated cost of £34,000.

▪

The Scottish Co-operative Wholesale Society, Ltd., are having a flour silo erected on a site at Bunhouse Road, Glasgow, at an estimated cost of £160,000.

▪

Associated Food Manufacturers are having a factory built on a 6½-acre site at York Road, Belfast, N. Ireland, at an estimated cost of £1,500,000.

▪

Joseph Stocks and Sons, Ltd., 37, Hanging Ditch, Manchester, 4, are having a bacon and meat processing factory built at Stanley Street, Cheetham, Manchester.

▪

Foster Clark, Ltd., food manufacturers, have plans in hand for the erection of additional factory premises covering an area of 11,000 sq. ft. at Maidstone, Kent.

▪

J. Marr and Son, Ltd., trawler fishermen, St. Andrew's Dock, Hull, are having a cold store built on a site at Walcott Street and Goulton Street, Hull.

▪

F.M.S. (Farm Supplies), Ltd., are having a grain milling and storage building erected at the rear of their premises at 13, Thurso Street, Glasgow, W.1, Scotland.

Company Profits & Prospects

More about the milk merger

The directors of United Dairies, Ltd., and Cow and Gate, Ltd., announce that it has been decided to extend the forthcoming offer to include the existing preference capital of the two companies. The basis of the offer will be:

21 6% cumulative preference shares of £1 in the holding company for every £20 6% non-cumulative preference stock in United Dairies, Ltd.; 21 6% cumulative preference shares of £1 in the holding company for every £16 7½% cumulative preference stock in Cow and Gate, Ltd.; and 21 4½% cumulative preference shares of £1 in the holding company for every £20 4½% redeemable cumulative preference stock in Cow and Gate, Ltd.

The 6% cumulative preference shares and the 4½% cumulative preference shares in the new holding company will rank equally as one class of shares in all respects, except the rate of dividend. The shares will be entitled to a minimum premium of 1s. 6d. per share in a return of capital on a winding up or otherwise.

It is hoped to post the full offer to holders of all classes of capital in both companies early in March.

The directors of Aplin and Barrett, Ltd., announce that they have opened negotiations with the boards of United Dairies, Ltd., and Cow and Gate, Ltd., with a view to joining, in due course, the proposed merger company.

United Glass Bottle Mfrs.

At the extraordinary general meeting of the United Glass Bottle Manufacturers, Ltd., held recently, resolutions were passed changing the name of the company to United Glass, Ltd., with effect from March 1, 1959, and increasing the authorised capital to £5,450,000 by the creation of 1,000,000 ordinary shares of £1 each, to be converted into stock when issued and fully paid.

At the meeting the chairman, Mr. L. A. Elgood, O.B.E.(MIL.), M.C., D.L., J.P., C.A., confirmed that there is no immediate intention to issue any of the additional capital, and gave an assurance that no issue of shares would be made such as would affect the control of the company or the nature of its business without the prior approval of stockholders.

Chocolate factory extension

Work has begun on a 4½ acre extension to the Somerdale, Bristol, chocolate factory of J. S. Fry and Sons. It is stated that the extension, which will cost £1 million, is expected to be fully operative in 1960.

The new building will be 450 ft. long by 90 ft. wide.

Bakers' and Confectioners' Exhibition

M. Pierre Massar, president of the International Confectioners' Union, has confirmed that the Union's conference would be held in London during the International Bakers' and Confectioners' Exhibition, October 3-8.

Other conferences scheduled to take place during the exhibition are those of the International Master Bakers' Association and the Praline and Cake International.

Amalgamation

Economic Utilities, Ltd., and Robert Pintus and Co., Ltd., both of Royal London House, Finsbury Square, E.C.2, have amalgamated their business and are now trading as Briess, Pintus and Co., Ltd.

Research subsidiary

A new company, Griffin and George (Research and Development), Ltd., has been formed by the Griffin and George group to conduct research into, and the development of, new and improved scientific instruments and apparatus for laboratory use and process control.

The research director is Dr. A. J. P. Martin, F.R.S., well known for his work on partition chromatography, acknowledged by the award in 1952 of the Nobel Prize for chemistry (jointly with Dr. R. Synge).

New laboratories to house the research and development staff will be designed and equipped. A major part of the company's effort will be directed towards a review of modern analytical techniques and the development of the instruments and apparatus for applying them in the laboratory and on the plant.

Notes for Contributors and Authors

The Editor of FOOD MANUFACTURE welcomes articles, news items and other contributions on all aspects of food production.

The purpose of this journal is to exchange information between all those concerned in the food industry. Articles should therefore be written in a readable style, avoiding esoteric terminology and technical jargon, and should contain factual and practical information.

A preliminary synopsis should, preferably, be sent to the Editor, and the contribution itself should be typed in double spacing on one side of the paper only. It should bear the name and address of the author and should be accompanied by photographs suitable for illustrations.

Forthcoming Events

Society of Chemical Industry

Food Group

March 11. Ordinary meeting. 14, Belgrave Square, London, S.W.1, 6.15 p.m.

March 19. Joint meeting with the East Anglia section. Chromatography as an analytical tool. I. Smith. Norwich.

March 25. Joint meeting with the Oil Fats Group. Developments in the oil milling and animal feedingstuffs industry. J. G. Collingwood. 14, Belgrave Square, London, S.W.1, 6.15 p.m.

The Nutrition Society

March 7. Symposium on rumen function. Royal Veterinary College, Royal College Street, London, N.W.1, 10.15 a.m.

Society for Analytical Chemistry

March 6. Annual general meeting. Meeting room of the Royal Society, Burlington House, Piccadilly, London, W.1, 2.30 p.m.

Bacteriology conference

At the Summer Conference of the Society for Applied Bacteriology, to be held in London on July 7, 8, and 9, 1959, a symposium will be held on "Lactobacilli." Those interested may obtain more details from the Hon. Sec., G. Sykes, Boots Pure Drug Co., Ltd., Microbiology Division, Standards Department, Nottingham.

Birmingham cold store

Smiths Insulations, Ltd., have just completed a new 1,000,000 c. ft. cold store at Perry Barr, Birmingham, for the Union Cold Storage Co.

Mr. B. T. Smith and the team of designers and technical experts, all of whom work for Smiths, were completely responsible for the design of this store.

The construction of this store followed their usual practice of prefabricating structural units and assembling them on the site. It is claimed construction time was shorter and building costs were considerably less than would have been possible using other methods.

The store is 262 ft. long × 164 ft. wide × 20 ft. high.

The general construction of the store consists of 9 in. of slab cork on the walls, ceiling, and floor. *Thermalite* insulation blocks with air cavities and self-supporting insulation are used for the outer shell. The store is contained within a steel-framed structure with trusses and there are no internal supports.

Food News Overseas

International Padova Fair

The arrangements for the 8th Packaging Exhibition at the 37th International Padova Fair (May 30 to June 14, 1959) will be radically changed, so that the exhibition will have an absolutely new form and make-up. The exhibition will be devoted to specialised packaging for food and domestic products and machinery.

For a considerable number of years the pavilion devoted to the Packaging Exhibition has been organised to present a general overall picture of the packaging industry. This industry has, however, expanded and developed so rapidly and extensively over the last few years that to present every possible aspect of packaging the Padova Fair Management feel the pavilion should be divided into special sections.

It has therefore been decided that although the exhibition as a whole will retain its present general character the fair management are arranging a cyclical programme aimed at alternating every two or more years the comprehensive presentation of a certain group of products and developments in the packaging world. This will enable the very latest equipment, materials and ideas to be displayed to their best advantage since new products are not often ready with only one year between exhibitions.

Alb. Keyzer of Zaandam, Holland, has added a Leyland articulated refined sugar tanker which transports 15-16 tons of unpacked sugar at a time to their road haulage fleet. The tractor portion is a 150 h.p. Leyland Super Beaver, *with automatic gear change. The vehicle was assembled and supplied by Leyland Holland, N.V. The stainless steel tank is mounted on a* Netam *semi-trailer and an aluminium sheath insulates the tank, minimising temperature loss on route and the subsequent moisture condensation.*

Sugar released from a silo is loaded through the front of the tank with the tank tipped into position by twin hydraulic rams. Four hydraulic legs can support the trailer. Power for these operations is supplied from a small petrol engine on the trailer.

The one-way tipping unit has a maximum angle of 45° for unloading through a valve at the back of the tank, usually via a steel shaft into a storage tank at the unloading point.

"Filled milk" to be banned

The government of Victoria, Australia, is to ban the manufacture and sale of filled milk in the State, according to Mr. Chandler, Minister of Agriculture. Mr. Chandler stated that filled milk constituted a greater threat to the dairy industry than margarine.

The Australian market is already well supplied with milk, and the introduction of this product could only eat into the established market. Mr. Chandler went on to say that if the sales of this product became established, then it was only a short step to the use of a completely synthetic product.

Sudan offered sugar factories

Local reports in Sudan state that the Czechoslovak Government and certain West German firms have offered to supply the Sudan with sugar factories in exchange, wholly or in part, for Sudan cotton.

Sudan annually imports 100,000 tons of sugar valued at £S5 million.

Trade and industry agree to reduce prices

Following considerations during recent weeks on how to stabilise prices, the Norwegian Government are now proposing to subsidise milk with 15 öre per litre (1d. per pint) and cheese with 120-140 öre per kilo (7d.-9½d. per lb.). This will reduce the price index by 2 points and cost 105 million kroner (£5,250,000) for the period March 1, 1959-July 31, 1960.

The government have asked major trade and industrial organisations to co-operate in reducing their prices, and the Federation of Industries, the Federation of Small Industries, the Federation of Commerce, and the Co-operative and Wholesale Society have agreed to recommend price reductions totalling ½ point on the index. The two agricultural organisations, however, have so far declined to support any price reductions for their products. The Federation of Trade Unions has undertaken to suspend all wage claims until the price index for June 15 is issued.

Australian trade ship

The Australian trade mission ship, m.v. *Delos*, which set out on a trade promotion tour of the Far East in November carrying a display of Australian goods worth £A1,000,000, has returned to Brisbane with orders totalling double that amount.

Australian wine and foodstuffs such as canned meat, canned fruit, dairy produce, and dried fruit were among the items in the cargo.

The tour of the *Delos* was arranged on the initiative of the Australian Exporters' Federation with the co-operation of the Federal Government. The ship visited Manila, Hong Kong, Shanghai, Japan, Borneo, the Solomon Islands, and New Guinea.

Chilean milk plant expansion

Approval has been given for the use of 71 million pesos of counterpart funds, resulting from the sale of U.S. agricultural surpluses, in the expansion of the Frutillar milk processing plant.

Packaging

(*Left*): Poly-Punnets by the Metal Box Co. (*Right*): These Diolam biscuit packs are made by Transparent Paper Ltd. (*Below*): Six varieties of processed cheese are combined in this pack by Kraft Foods Ltd. (*Bottom right*): Window type packs made by the Metal Box Co. for Eskimo Foods' skinless sausages.

Processed cheese pack

Kraft Foods, Ltd., have introduced a variety pack containing a triangular portion of each of the following: processed Cheddar, Old English processed cheese, *Velveeta* cheese food, cheese and onion, cheese and tomato, and cheese and celery spread.

The variety pack, which is available nationally, costs 1s. 3d.

Soft fruits container

An additional shape and size of *Poly-Punnet* is now being produced by the Plastics Group of the Metal Box Co., Ltd. Known as *Poly-Punnet No. 2*, it is square and measures 4⅛ in. by 2½ in. deep.

Injection-moulded in a light, lattice construction from toughened polystyrene, the new punnet will hold 1 lb. of strawberries or cherries, or a wide choice of other fruits and vegetables varying from apples to corn on the cob and mixed salad packs. But it can be used equally well for other kinds of foodstuffs and non-perishable goods, like wrapped cakes, biscuits, boiled sweets, soap, knitting wool, and small toys.

The container, like its predecessor, can be overwrapped with cellulose film, either completely or with a sleeve. They are available in a wide range of colours for quantities of 50,000 or over.

Sausage pack

Eskimo Foods, Ltd., have introduced new window-type packs for their skinless pork sausages. The packs were designed by Eskimo Foods and are produced by the Metal Box Co., Ltd.

Although a six-sausage pack has been on sale for some months, this is the first time that the firm have marketed a pack containing 10 sausages.

The packs carry the Eskimo Boy symbol, which is being gradually introduced on all their packs; are coloured blue and white, with *Eskimo* in red lettering with a yellow outline to accentuate brand recognition; and have a high gloss wax finish.

Biscuit packs

Two additions to Burton's range of *Diolam* packs are *Palace Assortment* and *Daisy Creams*.

With the name of the maker and the type of biscuit readily identifiable, these two glossy packs are said to hold their own in a biscuit display. *Diolam* is produced by Transparent Paper, Ltd.

Information room

The information room of the Industrial Division of Gordon and Gotch (Sellotape), Ltd., was officially opened recently. A combined showroom, meeting-place, and advice centre, it is situated on the ground floor of 8-10, Paul Street, E.C.2.

The information room draws attention to both a machine age in the tape field, and technical developments in tapes. It provides an opportunity for first-hand viewing of Sellotapes' developments at all times.

Milk shakes

A milk shake in a straw has been introduced by Mellin's Foods, Ltd. All the user has to do is to suck milk gently half-way up the straw, and then blow this back into the rest of the milk to dissolve the milk shake powder and flavour, which are compressed in the end of the straw, and aerate the drink. The milk shake is then ready to drink.

The straws are marketed in packets of 10, retailing at 1s. 3d., and are available in 3 flavours—strawberry, raspberry and chocolate.

New Companies

Arck Holdings, Ltd. (616568.) 102, The Royal Exchange, Manchester, 2. To carry on the bus. of importers, exporters, mnfrs. and mchts. of and dlrs. in preserves and other foodstuffs, etc. £100. Dirs.: Wm. Combie, J. S. Allison, and A. A. Raven.

M. R. Ash (Ashburton), Ltd. (617332.) 17, North Street, Ashburton, Devon. To take over the bus. of mnfg., wholesale and retail confectioners carried on by M. R. Ash. £100. Dirs.: Minnie R. Ash and Douglas C. Cocks.

Chickbar, Ltd. (617016.) Hill Top Farm, Coniston, Hull. Growers and processors of and dlrs. in foodstuffs, etc. £1,000. Dir.: Richard Richardson, jnr.

D. Combes (Garden and Pet Supplies), Ltd. (617444.) 51, The Hornet, Chichester, Sussex. Mnfrs. and dlrs. in animal, fish, and bird food, fodder, cattle food, etc. £100. Dirs.: Patrick D. and Dennis D. Combes.

H. and I. Glasser, Ltd. (615643.) Craven House, Kingsway, London, W.C.2. Mnfrs. of and dlrs. in animal feedingstuffs, fertilisers, etc. £100. Dirs.: Harry and Inger Glasser.

Edmund H. Ilott, Ltd. (615438.) Town Mills, Hertford. Mchts., mnfrs. of and dlrs. in grain, corn, farinaceous products and compounds. £5,000. Dir.: John H. W. Eadie.

Legrain Coffee, Ltd. (616405.) 2, Suffolk Lane, Cannon Street, London, E.C.4. To carry on the business of sellers, buyers of and dlrs. in coffee, tea, cocoa, confectionery, etc. £3,000. Dirs.: D. A. Black, B. W. Malkin, and E. J. Warburton.

A. Livingstone and Sons, Ltd. (615294.) 52, Hazell Avenue, Guildford. To carry on the business of stores props., mnfrs. and dlrs. in foodstuffs. £1,000. Dirs.: J. T. Kemp and A. T. Brown.

Motta, Ltd. (617188.) 74a, Regent Street, London, W.1. To carry on the bus. of mnfrs. and general mchts., importers and exporters of food and food products, etc. £1,000. Dirs.: Virginio Bertoluzzi, Alberto Ferrante (Milan), and Alfred Reginiano.

Rowbotham (Cooked Meats), Ltd. (617473.) 97, High Street, Erdington, Birmingham. 23. £5,000. Dirs.: D. W. H. and Beatrice M. Atkins.

C. and W. Supapak, Ltd. (616499.) Victoria Road, Netherfield, Nottingham. To carry on the bus. of pre-packers, canners, bottlers, processors, and preservers of fruits, vegetables, groceries, etc. £1,000. Dirs.: Michael T. and June M. Carter, and A. E. Chambers.

Superior Food Products, Ltd. (616756.) Cromwell Buildings, Blackfriars, Manchester, 3. To carry on the bus. of prepackers, packers, canners, bottlers, processors and preservers, and dlrs. in potatoes, fruit, vegetables, etc. £3,000. Subs.: S. M. Farrell and G. G. Jackson.

M. M. Swallow (Cardiff), Ltd. (616488.) 82, Tudor Road, Cardiff. Mnfrs. of and dlrs. in confectionery, chocolates, sweets, etc. £1,000. Dirs.: John T. Swallow, Annie Richards, Minnie M. and Mabel E. Swallow, and Doris M. Petherbridge.

These particulars of new companies recently registered have been extracted from the daily register of Jordan and Sons, Ltd., Company Registration Agents, 116, Chancery Lane, London, W.C.2.

New Scottish Companies

Aberdeen Cold Storage Co., Ltd. (33130.) Riverside Drive, Aberdeen. Mnfrs. of and dlrs. in ice. £50,000. Dirs.: B. S. Bellamy, J. M. Gardiner, H. Johnson and B. A. Parkes.

Aberdeen Near Water Trawlers, Ltd. (33276.) 68, Countesswells Road, Aberdeen. Fishermen. £100. Dirs.: B. S. Bellamy and B. A. Parkes.

Ailsa Wines (Girvan), Ltd. (33349.) 6, Woodside Crescent, Glasgow. Brewers, distillers, etc. £100. Dir.: Margaret S. Wylie.

British Feeding Mills (Scotland), Ltd. (33269.) Mnfrs. of and dlrs. in feedingstuffs, etc. £1,000. Dirs.: J. G. Davidson, Mrs. S. L. Davidson, J. McK. Wilkinson, H. R. Philpot, M. C. Mynard and R. J. Leiliott.

The Farmers' Grain Drying and Produce Co., Ltd. (33298.) 45, Frederick Street, Edinburgh. Grain driers and mnfrs. of animal feedingstuffs. £10,000. Dirs.: M. W. Tiplady and R. J. Firn.

Marketing Specialists, Ltd. (33291.) Mnfrs. and distributors of cold storage plants, refrigerators, etc. £500. Dirs.: A. Johnston, 63, Fowler Street, Tranent, and Mrs. Margaret A. Reilly, 20, Neilston Avenue, Glasgow.

Technical Press Review

March

World Crops.—Grain Handling: Grain Handling Equipment; Review of Methods of Infestation Control; Farm Grain Stores; Maize in Rumania.

Manufacturing Chemist. — Heating, Ventilation, and Insulating in Chemical Factories; Aerosol Insecticides; Price's (Bromborough) New Fatty Acids Plant; Amphoteric Surface-Active Agents; Progress Reports: Therapeutics; Fertilisers and Plant Nutrients; Detergents and Detergency.

Dairy Engineering.—Boilerhouse Maintenance for Economic Performance; Electropolishing—Method for Cleaning Stainless Steel Vessels; Aluminium Milk Cans—II and III; Instrumental Control and Automation in the Dairy Industry.

Petroleum.—Gas Liquid Chromatography; Royal Dutch Shell 'at Home; Oilfield Development; Skin Protection against Petroleum; Safety in the Refinery; Medical Services in the Oil Industry; Utilisation of Residual Fuel Oil.

Paint Manufacture.—Preview of Oil and Colour Chemists' Association Technical Exhibition; How Paints Stand up to Tropical Climates; Instrumental Control of Temperature.

Chemical and Process Engineering.—Variable-Area Flow Meters; The Flostat; New Trends in Flow Measurement and Control; Centrifuging; Uranium Factory at Springfields.

Trade Marks

COROLAC.—780,705. Milk products (for food), **L. E. Pritchitt and Co., Ltd.**, Uxbridge Road, Hatch End, Middlesex.

IXL.—780,490. Dessert fruits, all being tinned or bottled; and jams, marmalades and jellies (for food). **H. Jones and Co. Pty., Ltd.**, 23, Old Wharf, Hobart, Tasmania, Australia.

SILVERFLO.—780,710. Milk powder. **L. E. Pritchett and Co., Ltd.**, Uxbridge Road, Hatch End, Pinner, Middlesex.

MELBRAY PINK RIBAND.—772,742. Ice cream confectionery. **Melbray, Ltd.**, 158-162, Hurlingham Road, London, S.W.6.

ZORRO.—776,556. Non-medicated confectionery, biscuits (other than biscuits for animals) and preparations made from cereals for food for human consumption. **Walt Disney Productions, Ltd.**, 68, Pall Mall, London, S.W.1.

JOLYROL.—B779,525. Cakes. **J. Lyons and Co., Ltd.**, Cadby Hall, London, W.14.

TRALOONG.—779,861. Ginger (for food). **Joseph Travers and Sons, Ltd.**, 119, Cannon Street, London, E.C.4.

NOGARUM.—779,937. Chocolate, chocolates and non-medicated confectionery. **The Nestlé Co., Ltd.**, Hayes, Middlesex.

MACKINTOSH'S MUNCHIES.—780,073. Chocolate and non-medicated confectionery. **John Mackintosh and Sons, Ltd.**, Albion Mills, Halifax, Yorks.

WYEVERN.—780,943. Fruit preserves; vegetable preserves, jams, jellies (for food), lemon curd, mincemeat, and fruit pulp. **Ledbury Preserves (1928), Ltd.**, Fair Tree Works, Ledbury, Hereford.

LONE RANGER.—769,769. Coffee, tea, cocoa, cereal preparations for food for human consumption, biscuits (other than biscuits for animals), and non-medicated confectionery. **The Lone Ranger, Inc.**, 270, North Cannon Drive, Beverly Hills, California, U.S.A.

GOLDEN VALLEY.—775,566. Coffee for sale in Surrey, Sussex, Hampshire, and Berkshire. **Harris and Sons (Hindhead), Ltd.**, Headley Road, Hindhead, Surrey.

SUNSTAR.—778,211. Coffee, coffee essence, coffee extracts, mixtures of coffee and chicory, tea, cocoa, sugar; honey, treacle; salt, mustard, pepper, sauces; and spices (other than poultry spices). **H. and C. (Retail), Ltd.**, 179-189, City Road, London, E.C.1.

BLONY.—781,157. Chewing gum. **Topps Chewing Gum, Inc.**, 254-36th Street, Brooklyn, New York, U.S.A.

TAST-O-FREEZ.—781,248. Ice cream, ice cream confections, mixtures for use in making ice cream, and water ices. **International Enterprises, Ltd.**, 350, King Street, London, W.6.

JIM-JAMS.—781,434. Flour confectionery. **J. Lyons and Co., Ltd.**, Cadby Hall, London, W.14.

OPAL.—781,522. Non-medicated confectionery and toffee. **Mars, Ltd.**, Dundee Road, Slough, Bucks.

GOLDEN HOUR.—782,067. Chocolate, chocolates, and non-medicated confectionery. **George W. Horner and Co., Ltd.**, Stag Works, Foundry Lane, Chester-le-Street, Durham.

SPELLS.—782,130. Chocolate, chocolates, and non-medicated confectionery. **James Keiller and Sons, Ltd.**, 9, Albert Square, Dundee.

VIVCAT.—781,674. Food for cats. **Petfoods, Ltd.**, Melton Mowbray, Leics.

Recent Patents

COMPLETE SPECIFICATIONS ACCEPTED

807,865. EASTMAN KODAK CO.: Process for colouring and fortifying food consisting of or containing fatty materials.
808,122. DR. A. GETHER, G.M.B.H: Producing a red dye for colouring edible matter.
808,069. C. M. KEYWORTH AND CO., LTD.: Yeast raised baked goods and flour confectionery.
808,058. ALLMANNA SVENSKA ELEKTRISKA A-B.: Bread toaster.
807,949. BAKOVENBOUW VOORHEEN H. P. DEN BOER N.V.: Ovens for baking bread.
808,491. L. B. HURLEY and J. SIDOLL: Ice cream making apparatus.
808,905. V. JONAS and V. KORAN: Device for continuous fermentation in liquids.
808,729. UNILEVER, LTD.: Transmission of plastic substances; for example, the feeding of margarine to forming and wrapping machines.
808,969. PRESTIGE GROUP, LTD.: Fruit or vegetable peeling or cleaning device.
808,717. FARBENFABRIKEN BAYER A.-G.: Animal foodstuffs.

ABSTRACTS OF BRITISH PATENTS

Laminated packaging material

The requirements of material for retail packaging are high resistance to water vapour transfer, that is, loss of, or absorption of, moisture by the packed goods, good appearance, and the practicability of printing on the packing material.

In the present invention, the first ply of the laminate consists of 5-40 point board, having a weight within the range of from 20 lb. to 160 lb. per thousand sq. ft. This board is impregnated, not merely coated, with a moisture-resistant and odourless substance, to the extent of at least 10% of its weight. The second ply is of paper, of weight within the range of from 8 lb. to 90 lb. per 3,000 sq. ft. The two plies are united by a moisture-resistant adhesive which is not identical with the impregnant of the board.

A suitable impregnant is paraffin wax, and a suitable adhesive microcrystalline wax. The process is illustrated by a diagram appended to the specification.—805,975. *General Foods Corporation* (*U.S.A.*).

Packaging and preserving smoked meats

The patent relates to food products, particularly smoked meat products, such as sausages, ham, and the like. The meat product is placed in a bag of pliable material which is substantially air- and moisture-proof. The bag is evacuated, sealed, and sterilised or pasteurised. The material of which the bag is made has defined oxygen permeability and water vapour permeability. A suitable material is *Cellothene*, consisting of one layer of polyethylene and one layer of regenerated cellulose. The bags of *Cellothene* are filled, evacuated, heat sealed, and treated in a chamber through which passes air at 85°C. with a relative humidity of 60%. After about an hour the bags have become thoroughly pasteurised. They are removed, cooled by immersion in cold water, and packed in bags of regenerated cellulose, which are heat sealed.

When *Cellothene* bags are used, the humidity of the air is important. Air which is too dry or too moist has a detrimental effect on the *Cellothene*. If, however, the bag is made of the copolymer of vinyl chloride and vinylidene chloride, the humidity is of no importance, and the filled bags may be immersed in hot water or heated by hot dry air. The possibility of sterilisation by irradiation is mentioned.—805,985. *Unilever, Ltd.*

Rendering animal fats

The present invention relates to a continuous process of rendering animal fats. The latter, such as pork or beef, are ground through a special type of meat grinder having a plate size ranging from $\frac{1}{8}$ in. to $\frac{1}{4}$ in. The ground particles, of predetermined size, are conveyed to, and heated in, an open preheater tank with a heat source of 160°-170°F. The particles are thus liquefied by heating to 100°-120°F. The preheated fluid fat may then be pumped by a positive displacement progressing cavity type pump through a counter current type tubular heat exchanger to heat the material to coagulate proteins. A suitable temperature is 160°-170°F. both for the heat exchanger and the fat at the discharge outlet.

The fluid fat is then passed through a comminuter, such as a hammer mill, preferably with a screen size of 31/1,000 in., to disintegrate the fat to a cell size of the order of from 50 to 100 microns. The disintegrated fat and tissues, now non-fibrous, are pumped to a surge tank and heated to 150°-200°F. at the point of discharge. The material is then centrifuged to separate the fat, water, and solids.—804,145. *Hygrade Food Products Corpn.* (*U.S.A.*).

"Ready-to-eat" food products

This patent refers to breakfast cereal foods, particularly to increasing the protein content of rice and maize, which have high starch and low protein content. The new food consists of baked flakes of cooked particles of rice or maize having a coherent coating of flour of relatively high protein content containing more than 50% of wheat gluten, the flour being uncooked before the step of baking.

Whole kernels of rice, or particles of rice or maize, of 4 mesh size are washed, steamed, and cooked in water, seasoning and colouring matter being added, for 1-2 hr., in a rotary cooker, at 15-25 lb. p.s.i. steam pressure. The cooked particles are dried so that the moisture content falls from about 40% to about 25%, and tempered for 5-6 hr. at 110°-115°F. They are allowed to cool at room temperature for about an hour, the moisture content then reaching approximately 20%. The pre-cooked and dried particles are fed to a conveyor having mixing and propelling paddles. Warm water is sprayed on to the particles to the extent of 8-14% of the solids. The particles, without having time to absorb the added water are coated with flour of 60-80% protein content and containing more than 50% of gluten. Coating is by slow mixing. The particles, which remain separate, are moved forward and allowed to temper for a few minutes. They are then fed between rolls and bumped to form medium thin flakes. The flakes are dried to a moisture content of 10-15%, and baked for a short period. The purposes of baking are stated to be to minimise destruction or modification of the proteins, and to convert the flakes to a slightly puffed, light golden condition. After baking, the flakes may be sprayed with vitamins, if desired.—804,923. *Kellogg Company* (*U.S.A.*).

Cheese manufacture

Under modern hygienic conditions, souring of milk through the fortuitous presence of bacteria does not take place quickly enough for cheese manufacture. A cheese starter, a culture of lactic streptococci in milk ("bulk starter"), is therefore used to cause the lactose fermentation and acid production. These reactions may be delayed or inhibited by infection of the starter by streptococcal bacteriophages (bacterial viruses).

It has been found that the bacteriophage action is inhibited by treating the milk with an ion exchange material, whereby the calcium content is reduced to below 20 p.p.m. and preferably below 15 p.p.m., and even below 10 p.p.m. The ion exchange material may be any one which takes up calcium ions.. Those named are *Zeo Karb 226* and *Amberlite IRG 50*. Such substances have a largely specific action in removing calcium ions and do not substantially affect the essential growth factors in milk. The ion exchange material is buffered so that the treated milk has a *p*H of about 7·0.

As a medium for lactic streptococci, the milk may be further improved by adding small quantities of nutrients such as corn steep liquor, yeast extract, or casein hydrolysate, or the like. Butterfat may also desirably be added if skimmed milk was the starting material. The treated milk may be evaporated and later reconstituted with water. If the latter is hard, the calcium present is advisably rendered harmless by a sequestering agent, such as the disodium salt of ethylene diamine-tetraacetic acid.—804,647. *Fisons Milk Products, Ltd.* (*Northern Ireland*).

New patents are from the Journal of Patents and new trade marks are from the Trade Marks Journal. In each case permission to publish has been given by the Controller of Her Majesty's Stationery Office. Each of the publications is obtainable from the Patents Office, 25, Southampton Buildings, London, W.C.2.

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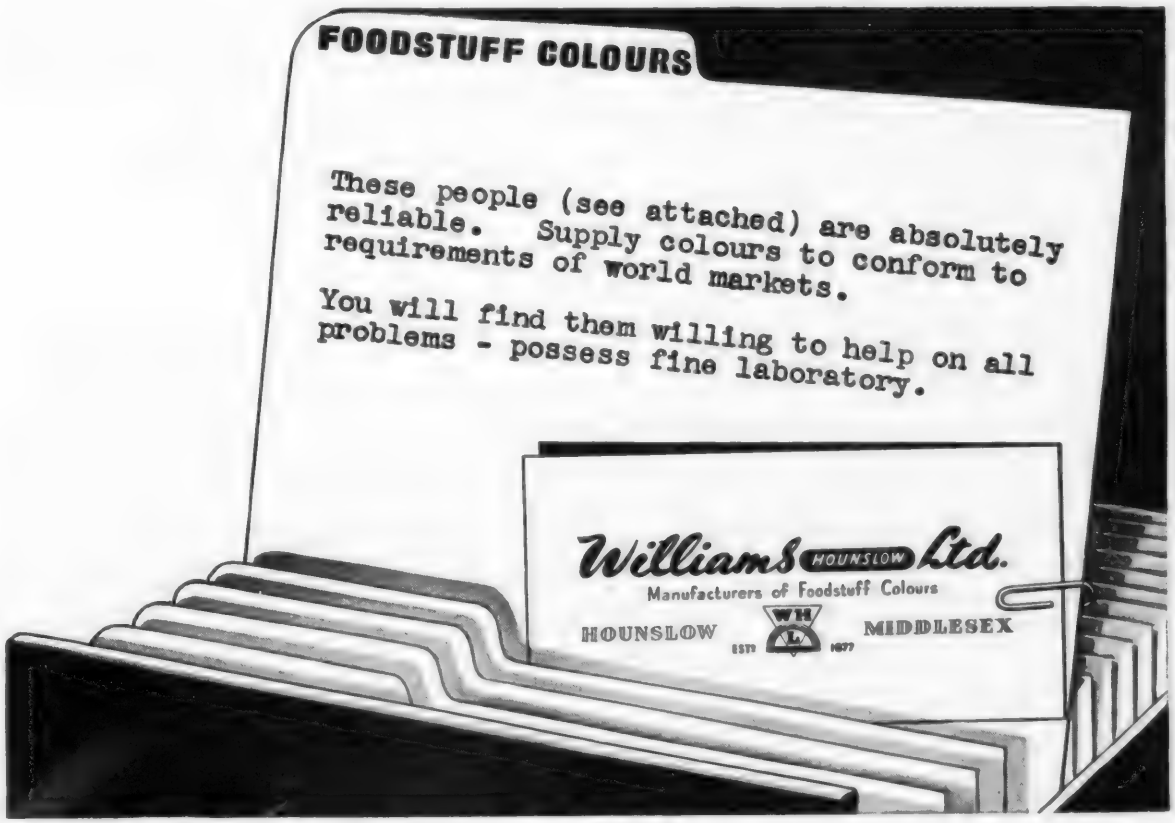
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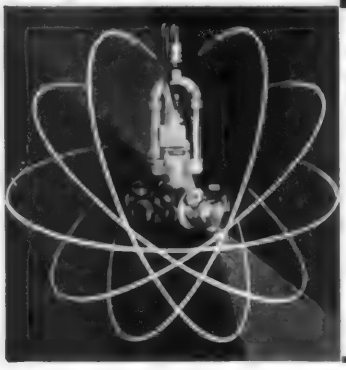

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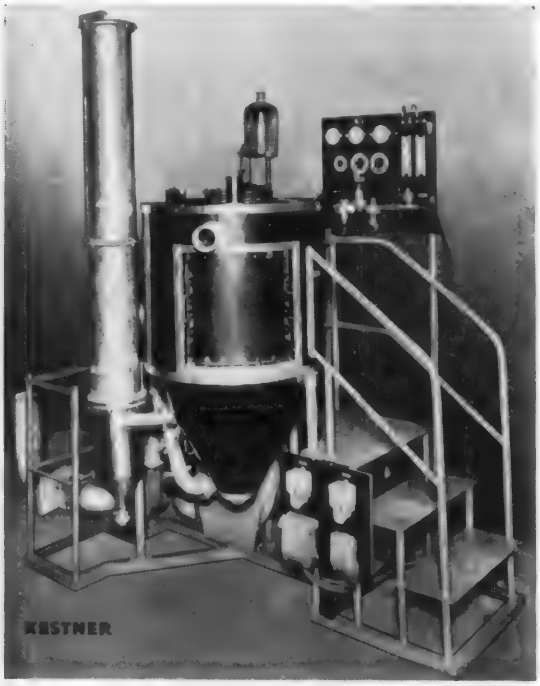

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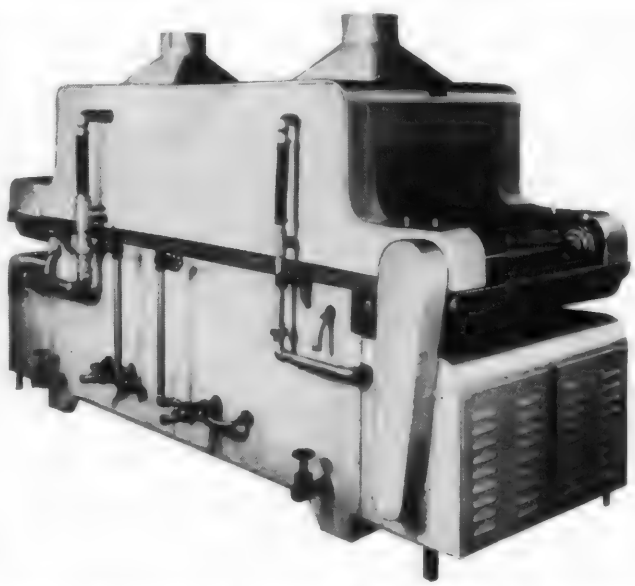

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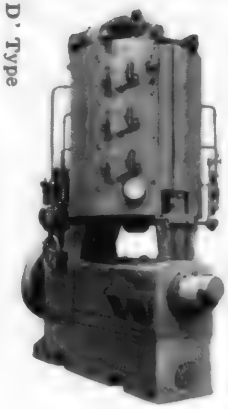

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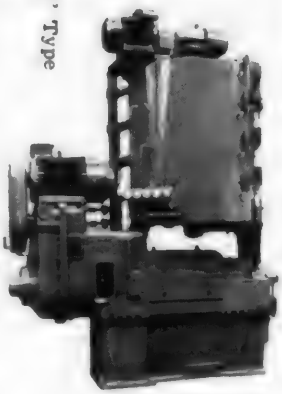

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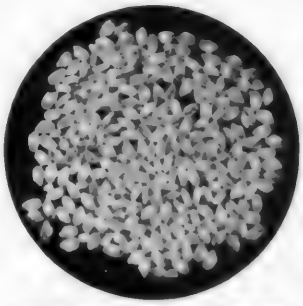

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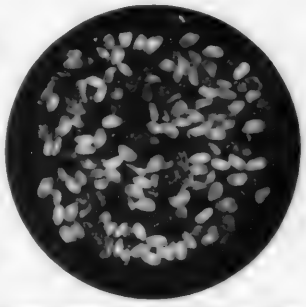

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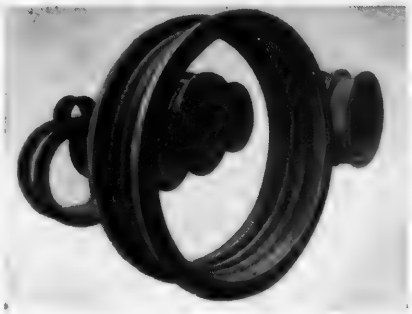

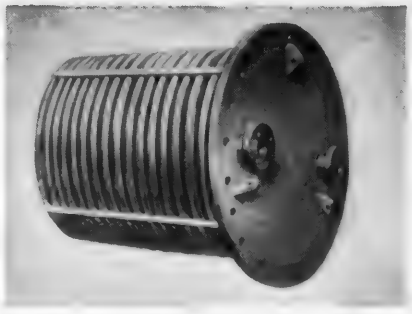

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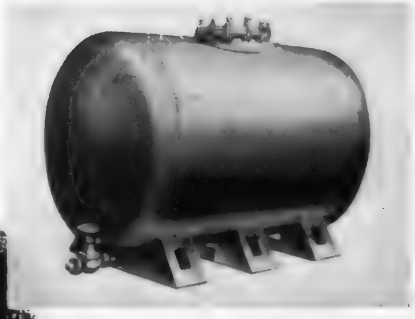

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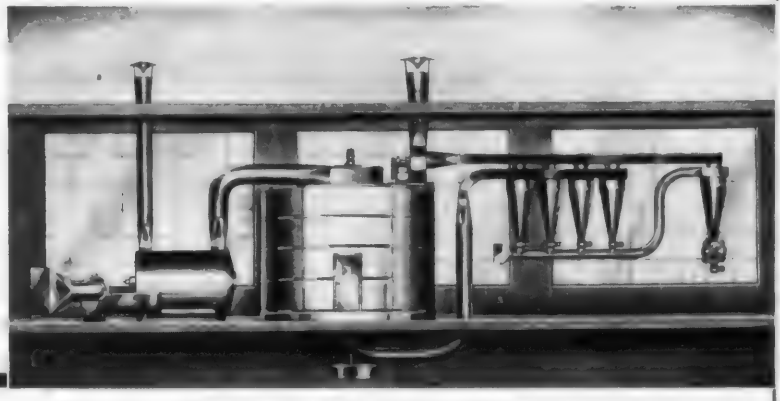

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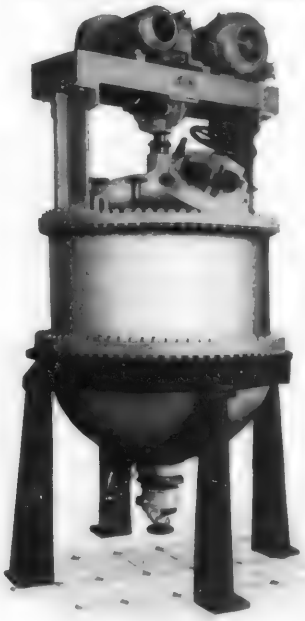

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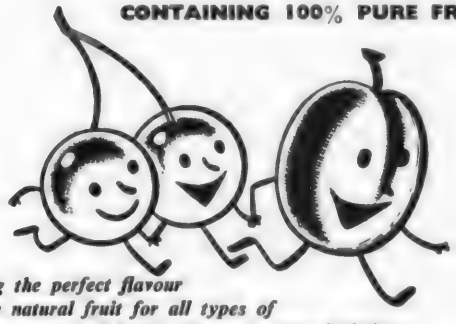

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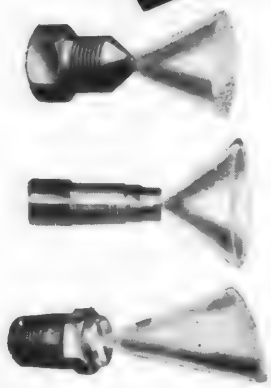

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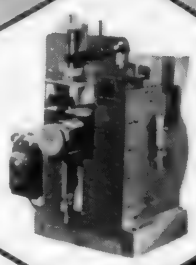

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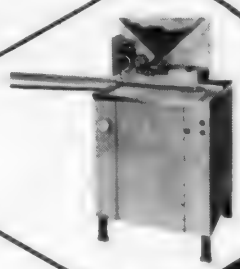

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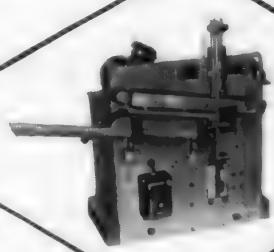

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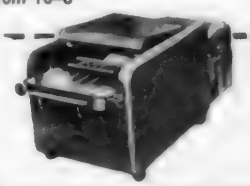

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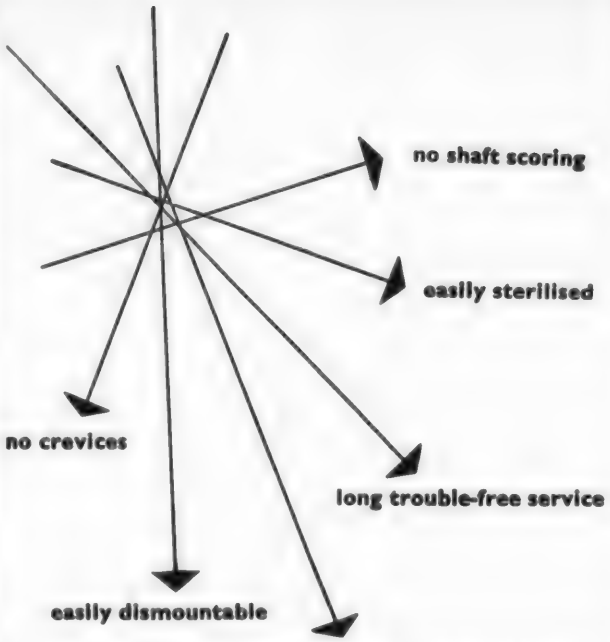

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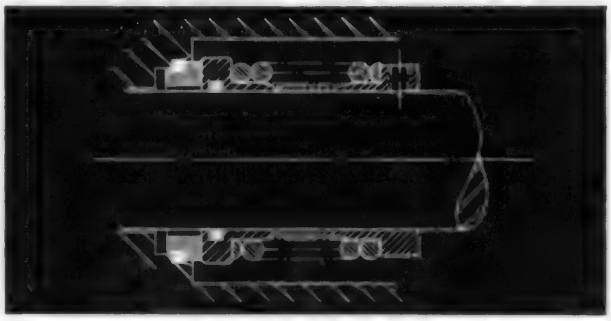

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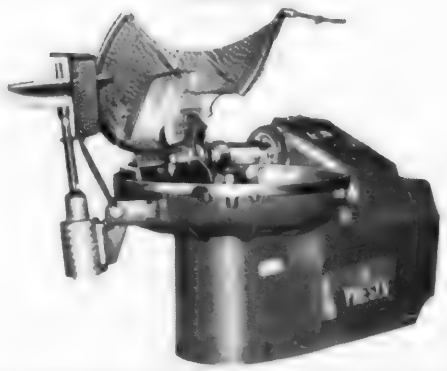

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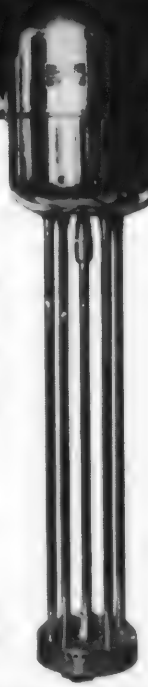

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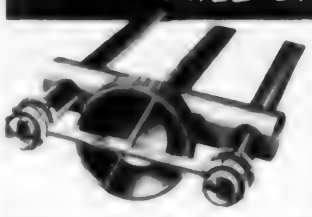

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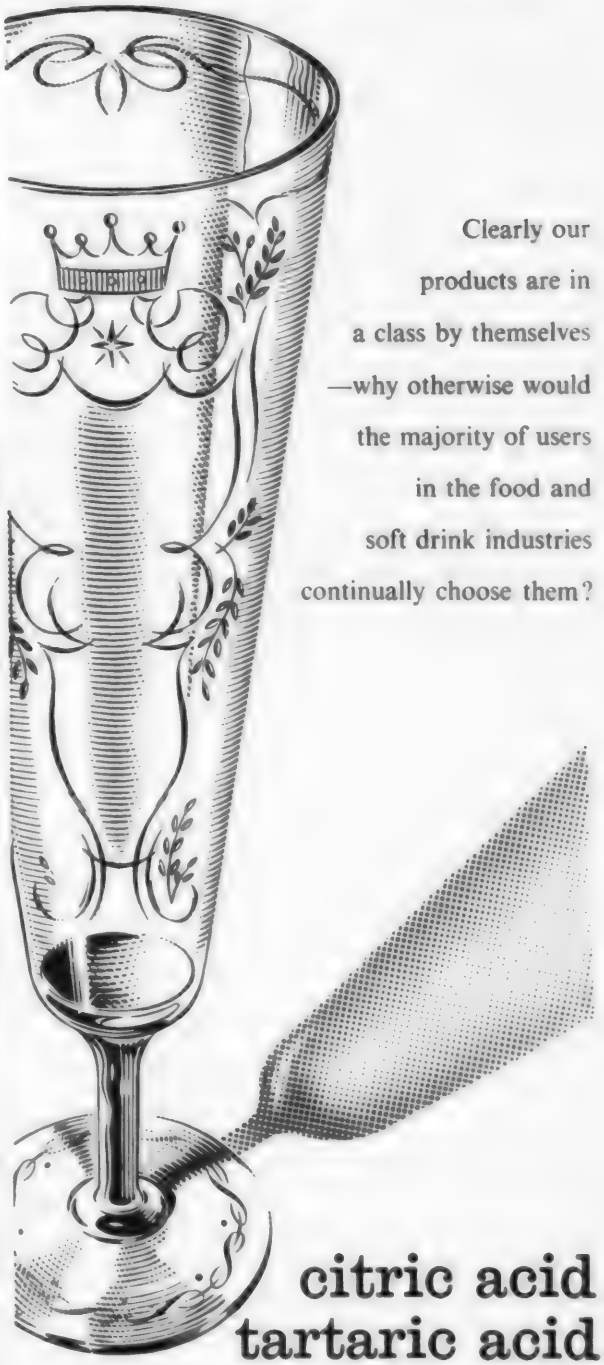

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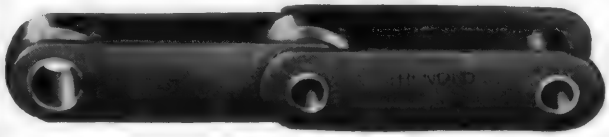

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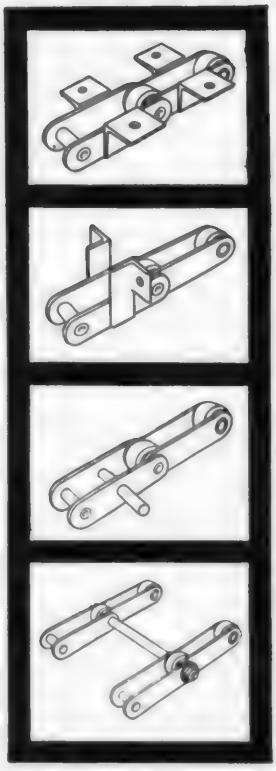

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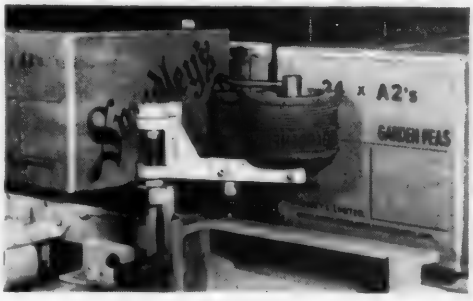

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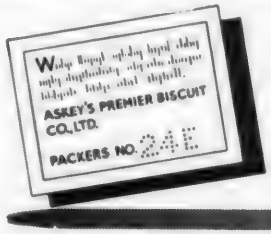

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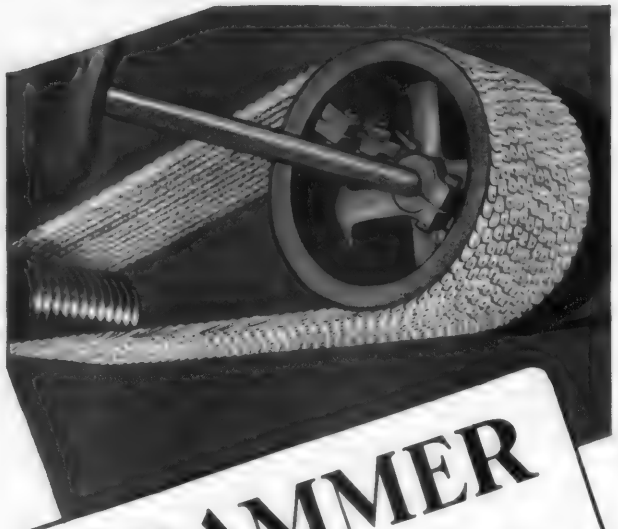

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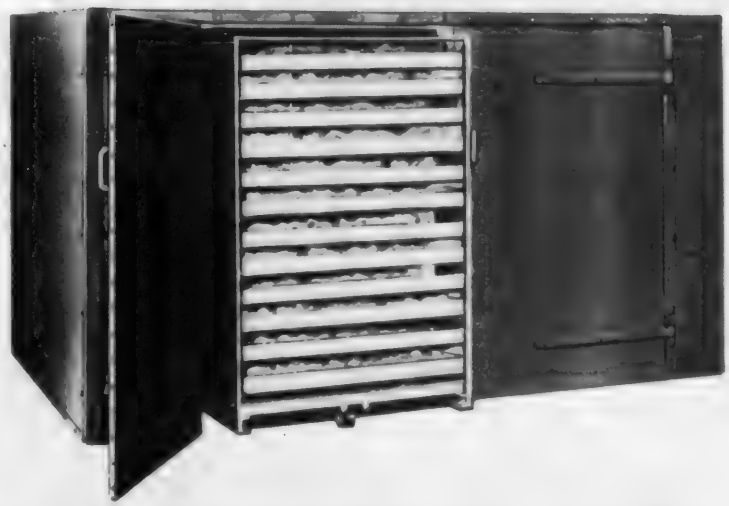

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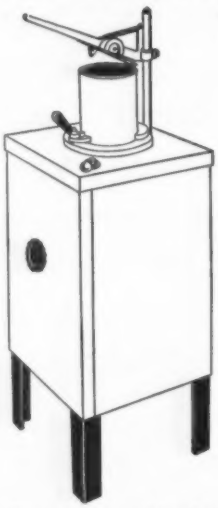

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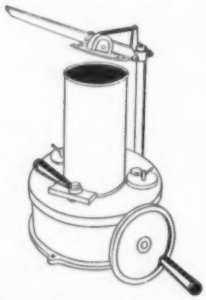

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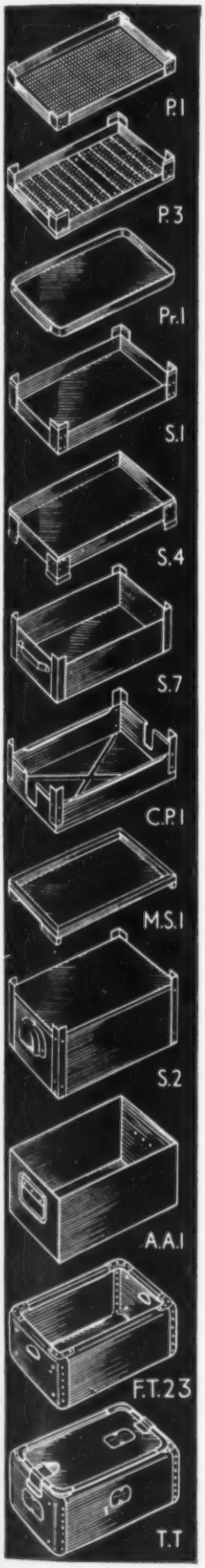

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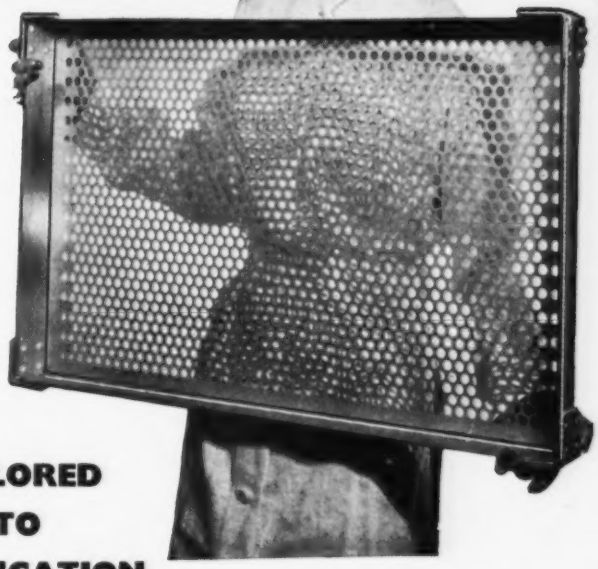

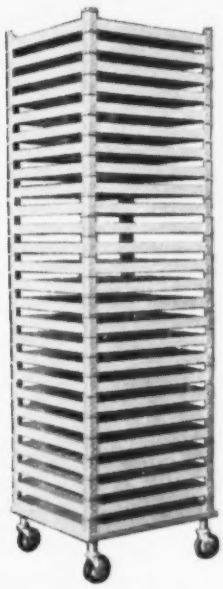

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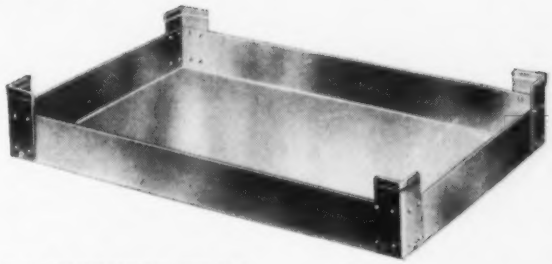

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